60 EXPERT REVIEWS!

Digital Camera SPECIAL

CAMERA SHOPPER

THE **BIGGEST** AND **BEST** PHOTO BUYERS' GUIDE

132 PAGES

TESTS YOU CAN TRUST!

Buy with total confidence! Tougher, scientific reviews

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EXCEPTIONAL RESULTS

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The camera technology revolution powered by the biggest brands

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THE BEST BEGINNERS

NIKON Z8
With high-end features for professional photographers

PANASONIC GH5 II
The perfect all-rounder for both stills and video

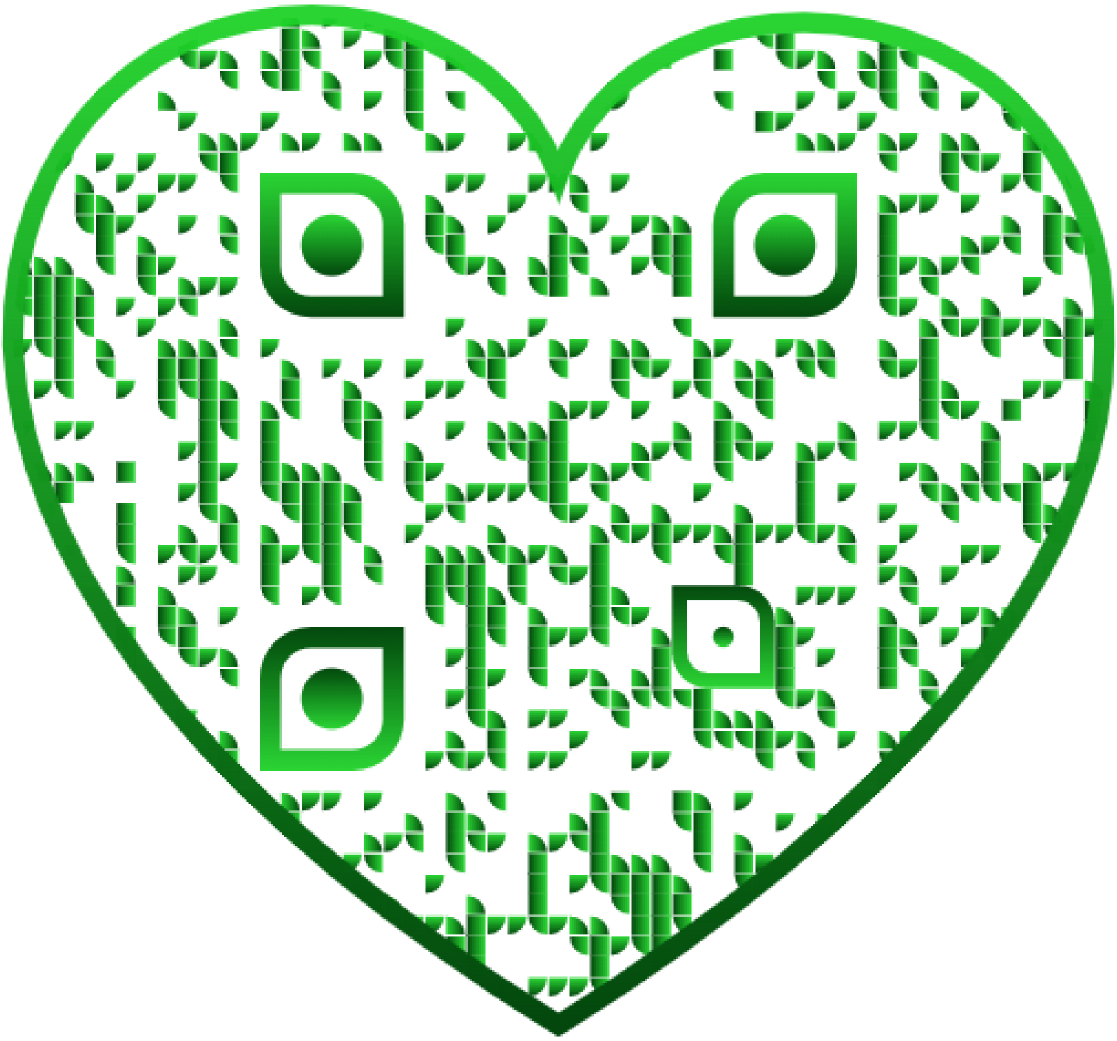
THE BEST KIT RIGHT NOW

- ✔ Lenses
- ✔ Roller bags
- ✔ Lighting & More

Digital Edition

FUTURE
VOLUME 29

CANON | NIKON | OLYMPUS | PANASONIC | FUJIFILM | SONY



Welcome to
CAMERA SHOPPER

With the growing accessibility of image-sharing platforms, the popularity of digital photography shows no sign of waning. We all want to capture the awe-inspiring sights, stunning compositions and treasured memories that we see and experience, but we might not have the means to do so. That is where Camera Shopper comes in. Here you will find all of the best camera, lens and accessory reviews that you'll need to make the most informed purchases. This latest edition collates all of the best buying tips for newbies and veterans that are looking to kit out or add to their camera collection. Use our guides, group tests and in-depth assessments to discover what camera and accessories best suit your needs and where to buy them from. This ultimate camera buying guide offers all the information that you need, so what are you waiting for?

OLYMPUS
OM-1
OM SYSTEM

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TRUSTED TESTS

RIGOROUS / ACCURATE / INDEPENDENT / FAIR

Cameras and lenses are run through a series of tests in our controlled laboratory environment

Camera Shopper is brought to you by the UK's most experienced team of photography journalists, which means you can trust everything you read on these pages and can buy your next piece of photography equipment with total confidence.

In case you need any further convincing, here's why our tests are the best:

Depth

At Camera Shopper, we take great pride in the rigorous nature of our testing process. Every product and service is tested in appropriate circumstances, and a combination of real world and objective tests are performed to ensure all products and services are credibly graded. Take a look at the opposite page for more details.

Passion

We believe the best way to test a product is to use it as it was intended, so our real world testing involves taking equipment on a proper shoot – whether outdoors or in the studio – and testing it exactly as you would use it in real life to let you know whether it's fit for its purpose.

Objectivity

Although scientific data won't tell you everything about a product, it's a great way to draw direct comparisons and sense-check our real world conclusions, so we've devised a series of controlled tests for cameras and lenses that supplement our real world testing with benchmarks.

Independence

Camera Shopper is 100% independent and never swayed by the influence of advertisers or PR firms. The tests you read in the magazine are our genuine unbiased opinions and Future Publishing, the company behind Camera Shopper, has a strict code of conduct on testing.

Consistency

We store data from every camera and lens test so that we can make full and standardised comparisons between products. We believe you don't just want to know how good these products are but how they compare with their rivals.

HOW WE TEST

Camera Shopper's test policy is the most strict and rigorous of any photography magazine. We believe the only way to bring you a genuine and reliable verdict on a product is to test it in both the field and the lab, so we use two sets of criteria to test SLRs and lenses – real-world testing and objective testing.

Real-world testing

The first and most important pillar of our process is real-world testing. We firmly believe that the best measure of a product is how it performs in the field (or studio) doing the job for which it was intended. The majority of our testing time is therefore spent using products in this way, so we can report back on how they cope under a number of different lighting scenarios and conditions.

The first part of our real-world testing involves telling you how a product handles and our impressions of its performance; the second is about examining the image quality produced, so we take a number of photographs under different conditions with every camera and lens we test, which means you can see the results achieved for yourself.

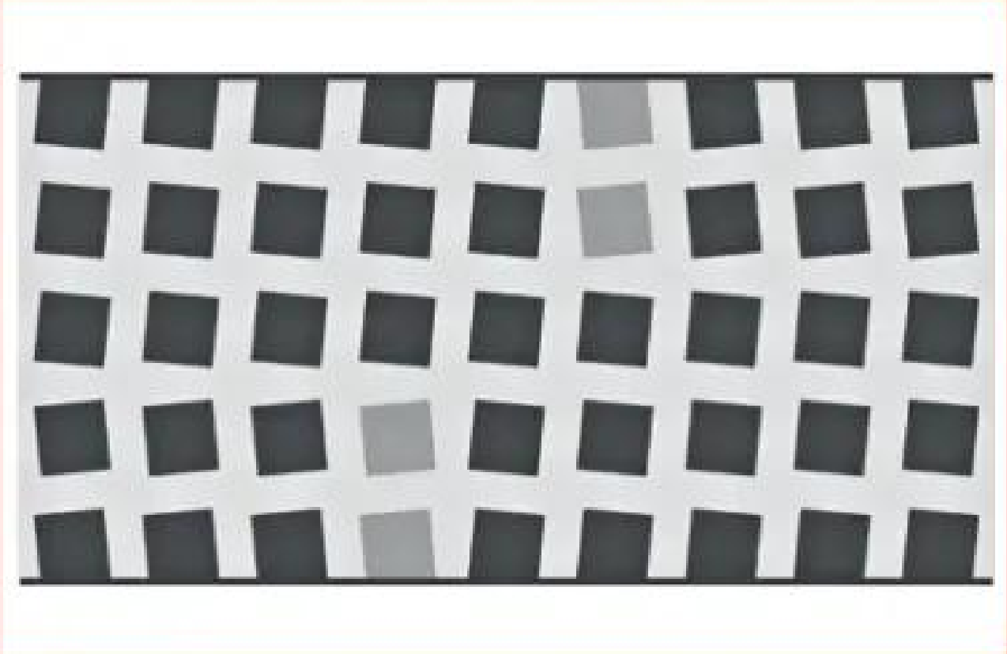
Benchmarking

The second pillar of our testing policy involves testing the output of cameras and lenses under controlled conditions. We shoot a series of test charts that are specifically designed to test different performance aspects of a camera or lens. Further details about the tests we perform can be found in the

The appliance of science

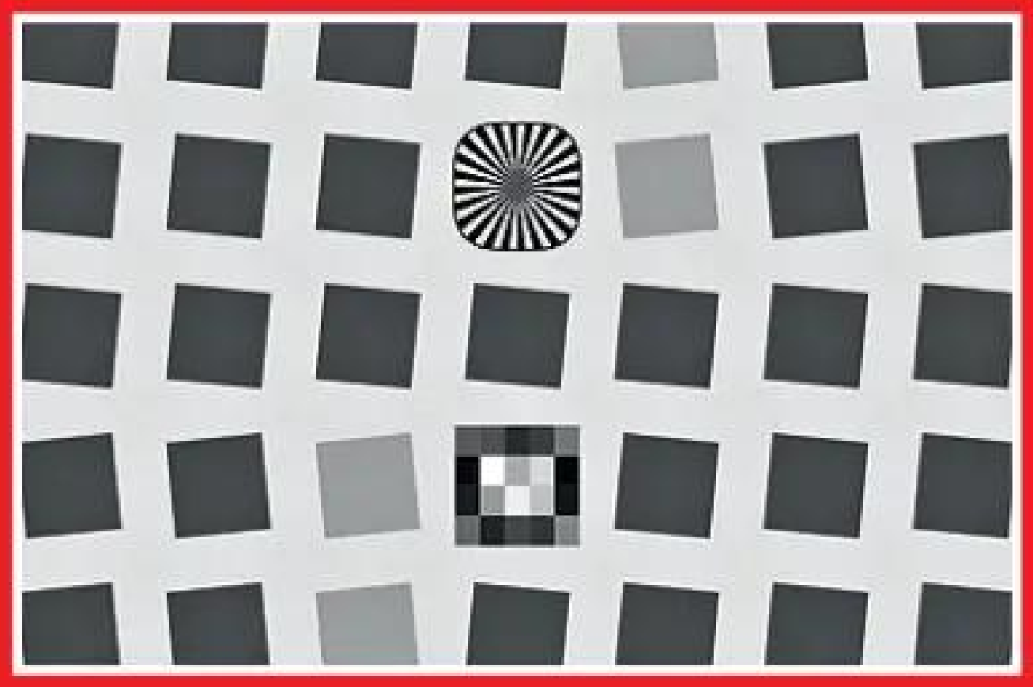
Camera Shopper runs tests under controlled conditions on both camera bodies and lenses. Lenses are assessed using an Imatest analysis of photos of three charts. We use both Imatest Master and DxO Analyzer to measure camera performance in four tests. Here's more about each test:

Lens tests



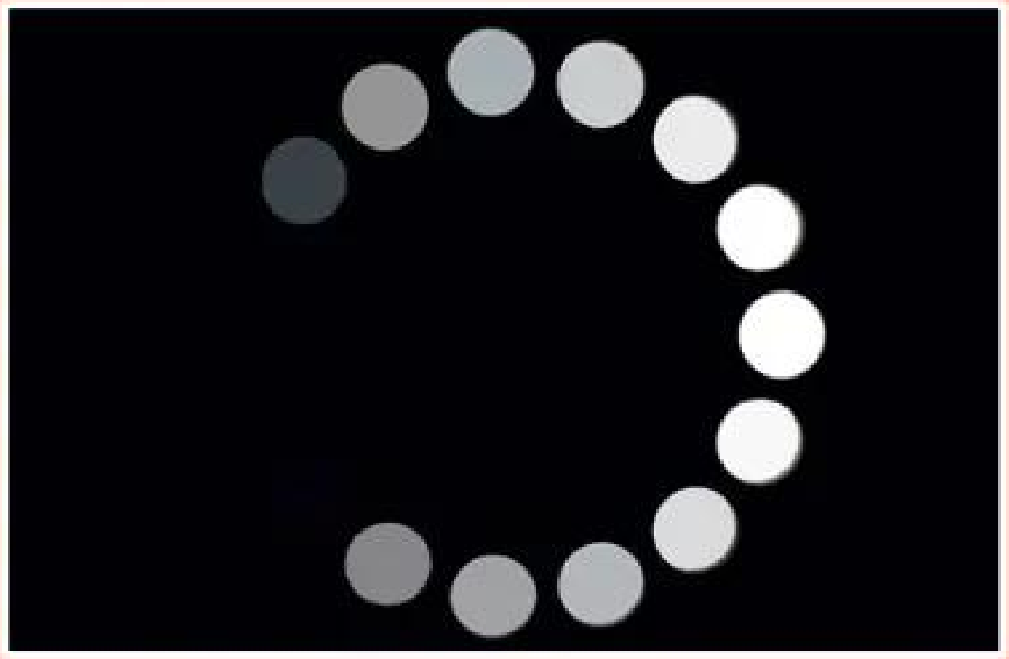
1 DISTORTION: IMATEST This test measures the distortion caused by the lens. We shoot the simple, lined chart pictured above and then output an accuracy percentage in Imatest. The most accurate result (i.e. the best) would be 0%.

2 FRINGING: IMATEST This test measures the occurrence of chromatic aberration. We shoot the same chart as for the other tests, then analyse the photos using Imatest. The results are expressed in pixels, with lower numbers being better.

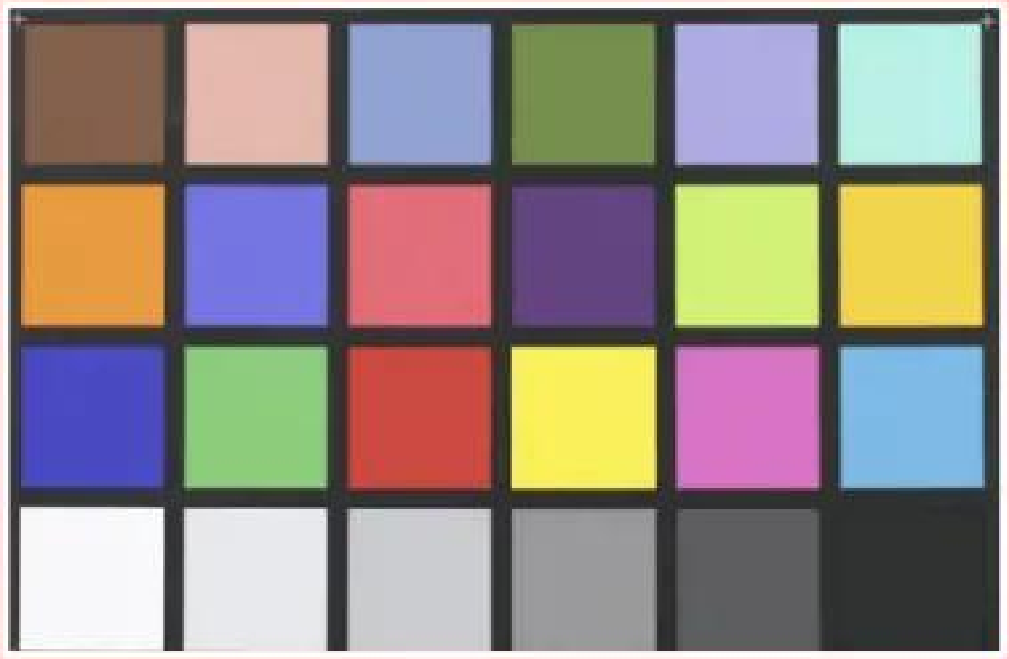


3 SHARPNESS: IMATEST Here we measure sharpness at different apertures from the centre to the outer edge. We shoot the chart pictured and Imatest outputs a figure based on line width divided by picture height – high numbers are better.

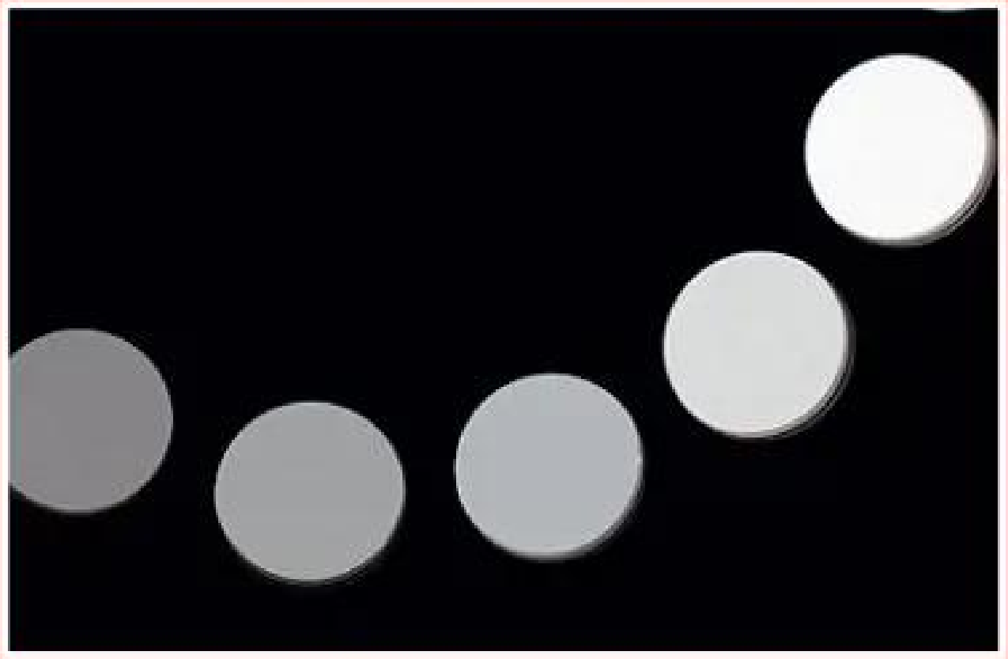
Camera tests



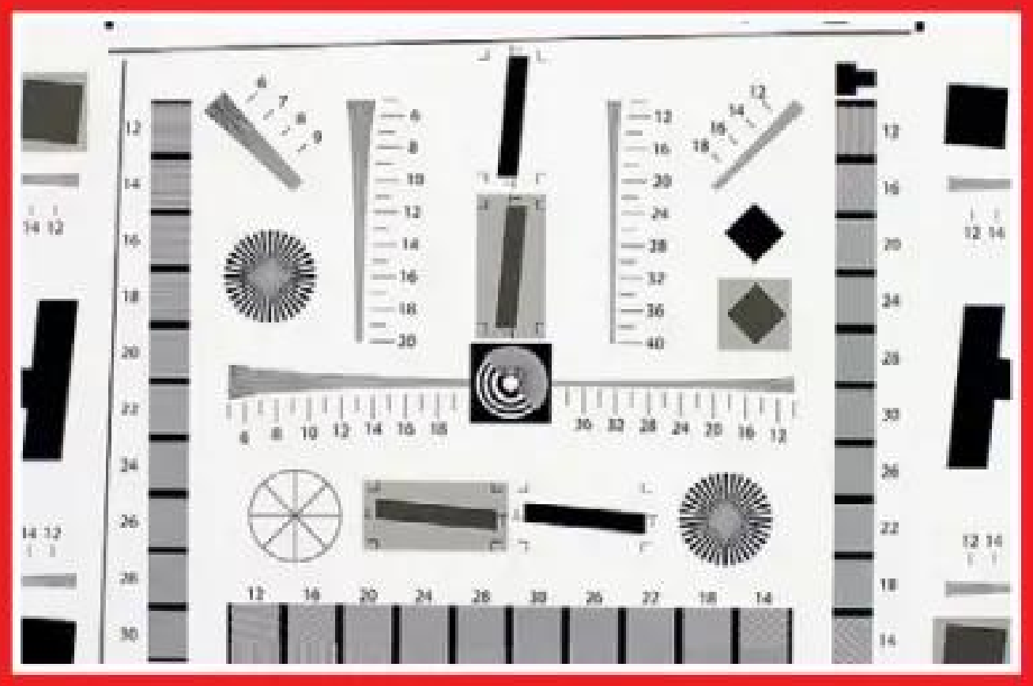
1 DYNAMIC RANGE: DXO ANALYZER This is a measure of a camera's ability to capture detail in the highlights and shadows. We use DxO's transmissive chart, which enables us to test a dynamic range of 13.3 stops.



2 COLOUR ERROR: IMATEST This measures the colour reproduction. We shoot the X-Rite ColorChecker chart pictured above and then output an accuracy percentage from Imatest, with 100% being the most accurate result possible.



3 NOISE: DXO ANALYZER We use the dynamic range transmissive chart to analyse the signal-to-noise ratio for raw and JPEG files at every sensitivity setting using DxO Analyzer. A higher value means that the signal is cleaner.



4 RESOLUTION We use a resolution chart based on ISO-12233 from Applied Image Inc to indicate the limit of the camera's vertical resolution at the centre of the frame. The higher the value, the better the detail resolution will be.

panel to the right. In order to minimise the variables when testing SLRs, we use Sigma's 50mm f/1.4 EX DG HSM prime lens, which is available for every SLR camera system.

Next, we perform an analysis of the test images using Imatest's Imatest Master (**www.imatest.com) and DxO Analyzer (www.dxo.com/intl/image_quality/dxo_analyzer**) to generate benchmark figures for each test. These can be plotted against the results from rival products to enable us to make a direct comparison and determine which performs better under a range of different test criteria.

Benchmarks shouldn't be seen as a substitute for real-world testing, though. We can test for a range of very specific performance criteria, but there are many more characteristics that only become apparent in actual use. Lab tests won't tell you which camera handles best in the field, for example, or which is easiest to use, but they do enable us to sense-check our lab results against real-world image tests and make accurate comparisons of different products' capabilities.

No other magazine goes this far to deliver equipment tests in results you can really trust.

Scores explained

Each of our tests scores out of five in one or more sub-categories; then we award an overall mark out of five. *Digital Camera* is 100% independent – and never swayed by advertisers. The tests you read are our genuine, unbiased opinions. Our company has a strict code of conduct on testing – the most rigorous of any photo magazine.

★☆☆☆☆ Forget it

★★☆☆☆ Below average

★★★☆☆ Good for the price

★★★★☆ Very good all round

★★★★★ An exceptional, best-in-class product

Look out for our five awards

Digital Camera ★★★★★ BEST ON TEST – Given to the top product in a group test

Digital Camera ★★★★★ GREAT VALUE – For products that offer superb value for money

Digital Camera ★★★★★ GOLD AWARD – Given to products that receive five stars overall

Digital Camera ★★★★★ LANDMARK AWARD – Given to products that are innovative & groundbreaking

Digital Camera ★★★★★ EDITORS' CHOICE – Given to products that merit very special attention

CAMERAS & ACCESSORIES

GET THE KIT YOU NEED WITH OUR IN-DEPTH REVIEWS

[GROUP TEST]

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Ready to step up to a 'proper' camera? Matthew Richards weighs up the options

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The most advanced camera on the market

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An excellent all-rounder

CSC or SLR? What's the difference?

Single-lens-reflex or SLR cameras have a mirror that bounces light from the lens up into an optical viewfinder. It's a tried-and-tested design that's much loved by enthusiast and professional photographers alike.

Like SLRs, compact system or mirrorless cameras can accept interchangeable lenses, but they don't have a mirror inside; and if there is a viewfinder, it's an electronic device that shows the image that's formed on the sensor. The advantage of this approach is that you can see the impact of your camera settings before you take a shot, so you know if you've set the correct exposure or if you're in black-and-white mode.

However, autofocusing tends to be a little slower, especially in low light – although the technology is improving all the time. Another advantage of omitting the mirror is that it enables CSCs and their lenses to be smaller, even when the same-sized sensor is used.

Both types of camera are capable of producing high-quality images. Some people prefer the larger size, faster autofocusing and optical viewfinder of an SLR, while others like the innovative features, smaller size and full-time Live View of CSCs. See overleaf for more.

CSC VS SLR
10 KEY DIFFERENCES

So you want a decent camera that takes interchangeable lenses? A few years ago that was easy – you had to buy a DSLR. But then in 2009 Olympus launched its first mirrorless camera, the Pen E-P1, and everything changed.

Though it didn't change overnight. Mirrorless cameras are great in principle because they're smaller, lighter and mechanically simpler. They're also just like supersized compact cameras to use, whereas DSLRs are a bit of a jump from a regular compact. Enthusiasts and pros, however, have taken a bit of convincing – first, that the image quality is good enough to match a DSLR's; second, that the features and handling are comparable; third and most important, that these cameras will have a proper range of lenses to match those that are already available for DSLRs.

So have mirrorless cameras done enough to be genuine DSLR rivals or, more to the point, are they already better? To help you decide, here are the key differences and what they mean for everyday photography.

1

PRICE

DSLR You can get more for your money with a cheap DSLR than a cheap CSC

CSC Cheap CSCs don't have viewfinders; those that do cost a good deal more

You might hope that the simpler design of a compact system camera would make them cheaper to buy, but that's not the case. If you want a fully-featured, 'proper' camera for the least money, then a DSLR is the cheapest option.

For example, the 24Mp Nikon D3300 DSLR has just about the best APS-C sensor currently on the market, an optical viewfinder (of course), decent manual controls and 700-shot battery life. Its nearest rivals on price in the compact system camera market can't match its resolution or its battery life and they don't have viewfinders.

In fact, the cheapest CSC with a viewfinder at the time of writing is the 16Mp Olympus OM-D E-M10, which currently sells for around 30% more than the Nikon D3300 – and it's only that cheap because it's just been superseded.

Once you get into enthusiast and pro market, however, the differences largely disappear – for any given amount of money you get broadly the same features, performance and power.

2

BATTERY LIFE

DSLR 600-800 shots is average, better models can shoot over 1,000 shots on a charge

CSC Much weaker, and typically around 300-400 shots. You'll need spare batteries

Battery life comparisons might not be exciting, but they are important when the differences are as great as this. The Nikon D7200 DSLR, for example, can take 1,100 shots on a single charge, while the Fuji X-T1 CSC, a close match on paper, can only shoot 350 photos before the battery expires. This pattern is repeated across the range of DSLRs and CSCs.

It's not clear why. DSLR batteries are sometimes larger, though not always, and you might have thought that driving the mirror up and down for each shot would consume more power, and that LCD display would be used just as much.

Apparently not, though, and this is one area where DSLRs do often have a substantial practical advantage.

DSLRs are pretty frugal with battery power, whereas compact system cameras typically use them up twice as fast

3

SIZE AND WEIGHT

DSLR Yes, they're fat and chunky, though this can be a help for big lenses (and big hands)

CSC Yes, they are smaller and lighter, but the lenses (mostly) are just as big as a DSLR's

Small size is one of the big selling points for mirrorless cameras, but it doesn't always work out that way because what you actually have to take into account is the size of the camera body and lens combination. This is a problem for APS-C mirrorless cameras because you can get a nice slim body but a fat, heavy kit lens. Some now come with retractable or power-zoom lenses but that doesn't help when you have to swap to a different type of lens.

Panasonic and Olympus cameras have an advantage here. The Micro Four Thirds sensor format is smaller (which many photographers don't like) but this means the lenses are smaller and lighter too (which many do).

4

LENSES

DSLR Canon and Nikon have a massive lens range for every job, and Pentax is not far behind

CSC Olympus, Panasonic and Sony have big ranges, while Fujifilm has a number of high-quality optics

If you want the widest possible choice of lenses, then a Canon or Nikon DSLR is possibly the best, but mirrorless cameras are gaining ground. Sony mirrorless cameras are well supported now – though more fast prime lenses and constant aperture zooms would help – and Panasonic and Olympus use the Micro Four Thirds format, which now has a large and established lens range behind it.

CANON ZOOM LENS EF 70-300mm 1:4-5.6 IS USM
Canon
24mm
IMAGE STABILIZER ULTRASONIC
Nikon
AF-S NIKKOR 24-70mm 1:2.8G ED

5

CONTINUOUS SHOOTING

DSLR The best DSLRs out there can no longer match the speeds of the best CSCs

CSC The mirrorless design makes it much easier to add in the high-speed shooting mode

You need a fast continuous shooting mode to capture action shots, and compact system cameras are streaking ahead here, partly because the mirrorless system means there are fewer moving parts and partly because many models are now pushing ahead into 4K video – this demands serious processing power, which helps with continuous shooting too.

To put this in perspective, Canon's top professional DSLR can shoot at 14 frames per second, but the mirrorless Olympus E-M1 II can shoot at an incredible 60fps. Panasonic, meanwhile, is pioneering the use of 4K video to capture 8-megapixel images at 30 frames per second.

6

VIDEO

DSLR Massively popular with pros but, arguably, only because DSLRs got there first

CSC 4K video becoming more common, better live view AF – this looks like the future

Most pros shooting video use a DSLR, but that says more about the rather conservative professional market than the technology. DSLRs were the first to offer professional HD and full HD video, together with a vast range of lenses and other accessories, and pros prefer systems with solid, long-term support.

But that was then. The industry is waking up to the potential offered by mirrorless technology, including 4K video (still not common on consumer DSLRs), efficient live view autofocus and high-speed data readout and processing. The Panasonic GH4, for example, has had a big impact as a hybrid stills/video camera that's equally good in both roles, rather than a stills camera adapted to shoot video.

7

FEATURES

DSLR Even entry-level models have full manual controls, and DSLRs are powerful cameras

CSC They match the DSLRs feature for feature, often going a step further than them

In terms of photographic features and controls, DSLRs and CSCs are hard to split. They all offer full manual control over exposure and focusing and can shoot raw files as well as JPEGs. In any one sector, such as entry-level cameras, enthusiast or pro models, the control layouts and capabilities are pretty similar. Entry-level DSLRs tend to hide away the manual controls under a layer of automation, but it's the same for CSCs.

Keep in mind the point about viewfinders, though – all DSLRs have viewfinders, but cheaper compact system cameras don't.

Canon
EOS-1D X
Mark II

Fn5
LVF
AF/AE LOCK
AFS/AFF
AFC
MF
Fn2
Q.MENU
Fn3
DISP.
M
8.0
250
1600
Lock
AUTO
SCN
M
S
A
P

Compact system cameras have advantages for both high-speed continuous shooting and 4K video capture, though the battle isn't over

8

AUTOFOCUS

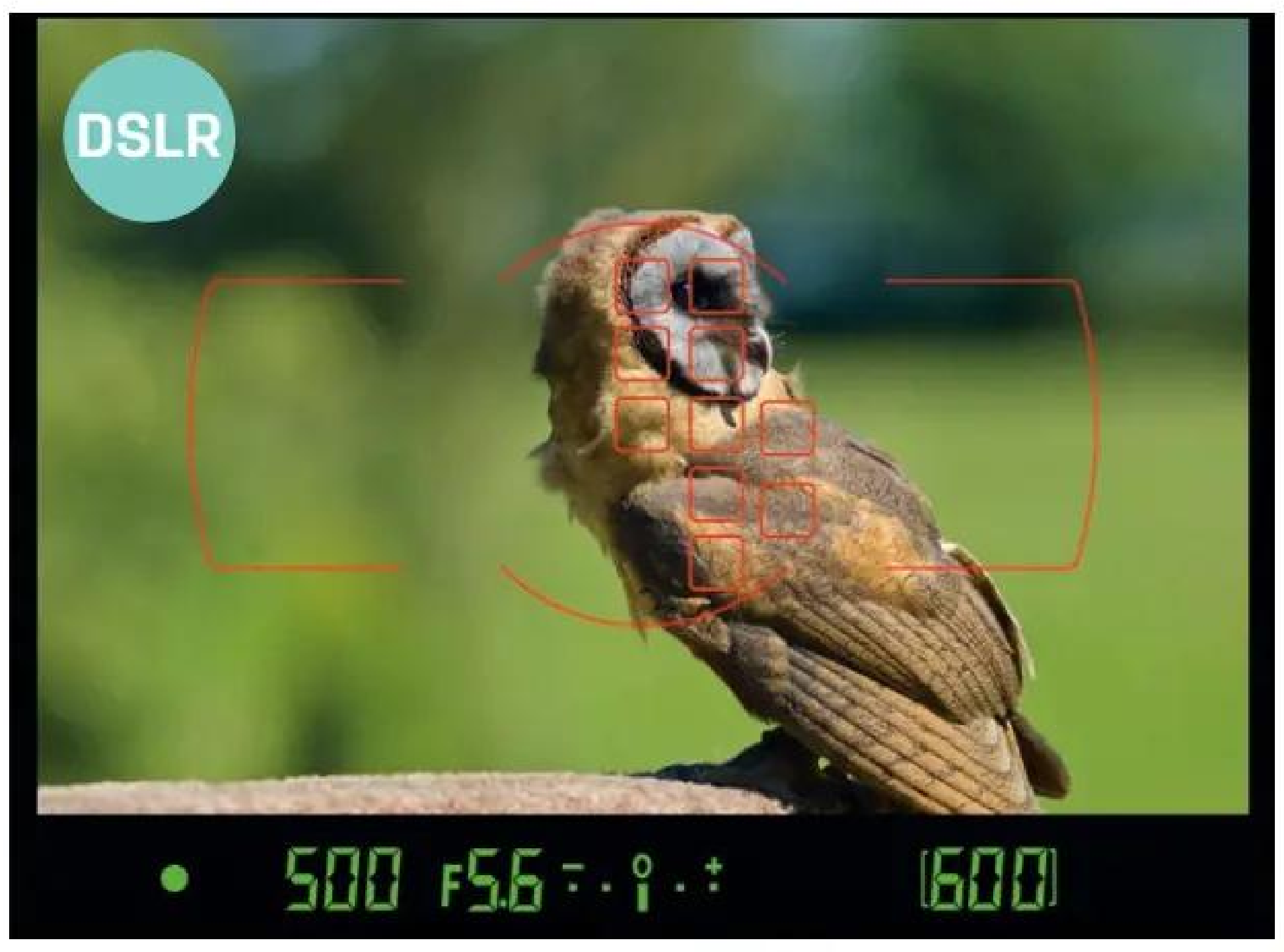
DSLR Still better, on the whole for tracking fast subjects, but weak in live view mode

CSC Full time live view AF means faster shooting when you're using the LCD screen

DSLRs use fast and efficient 'phase detection' autofocus modules mounted below the mirror in the body, but these only work while the mirror is down. If you're using a DSLR in live view mode, composing a picture or video on the LCD display, the mirror has to be flipped up and the regular AF module is no longer in the light path, so DSLRs have to switch to a slower sensor-based autofocus system.

Some Canon DSLRs have hybrid AF using phase-detection pixels built into the sensor. This gives faster autofocus in live view mode to close the gap on CSCs, but this technology is currently the exception for DSLRs rather than the rule.

CSCs use sensor-based autofocus all the time but it's tuned for speed and efficiency. More advanced models have advanced 'hybrid' AF systems combining contrast autofocus with phase-detection pixels on the sensor, and the best are now so fast that they're getting almost as good as DSLRs at locking onto and following moving subjects. Panasonic and Olympus cameras use a smaller Micro Four Thirds sensor format, but this means the lenses are smaller and lighter too, which is a real advantage for many photographers.



DSLRs use phase detection AF sensors. They're fast, especially with moving subjects

9

VIEWFINDERS

DSLR Many still prefer an 'optical' view for its clarity, natural look and lag-free viewing

CSC Others prefer to see a digital rendition of the scene as the camera will capture it

All DSLRs, even the cheapest, come with an optical viewfinder because it's an integral part of the DSLR design. However, many compact system cameras don't have viewfinders at all, so you have to use the rear LCD to compose photos, which doesn't always work so well in bright light.

Compact system cameras with viewfinders cost more, and these are electronic rather than optical viewfinders – they display the image direct from the sensor readout and not via an optical mirror/pentaprism system.

Electronic viewfinders are advancing in leaps and bounds, so the latest rarely show any pixelation or 'granularity', though there can often be a slight but visible 'lag' if you move the camera quickly.

The advantage of electronic viewfinders is that they can display a lot more information than an optical viewfinder, including live image histograms, for example. They can also simulate the digital image the camera will capture.

This simulation is not always perfect, and many photographers prefer to see the world with their own eyes as they compose the image and check the digital version on the LCD straight after it's been captured.

CSC
DR 200
MF
M
1000
F 5.6
+0.0
ISO 51200

CSCs use electronic viewfinders capable of displaying much more shooting information

10

IMAGE QUALITY

DSLR DSLRs use the latest and best state of the art APS-C or full frame sensors

CSC They use the same sensors, but there are also smaller formats for smaller cameras

There's nothing to choose here either. Currently, the highest resolution is in a DSLR, the 50Mp Canon EOS 5Ds, but the 42.5Mp Sony A7R II isn't far behind.

It's not just about megapixels, though, because the main factor in image quality is sensor size. Full frame sensors are the biggest and offer the best quality, while cameras with APS-C sensors are almost as good and much cheaper – and you can get these sensor sizes in both the DSLR and CSC cameras.

But the compact system camera market offers smaller formats too. The Micro Four Thirds format used by Panasonic and Olympus is smaller than APS-C, but so are the cameras and lenses.

Overall, then, there's no intrinsic image quality advantage in a DSLR, given that the same sensor sizes are available in compact system cameras too.

Verdict

The technical differences between DSLRs and CSCs aren't the only things you need to consider, and may not even be the most important. The only way to decide once and for all is to simply pick them up and try them out to see which you prefer. You might prefer the chunky feel and optical viewfinder of a DSLR camera, or you might like the smaller body and more precise feel of a CSC.

For those on a budget, a cheap digital SLR gives you more than a cheap compact system camera. Further up the price range it's closer, and you'd have to say that while some might prefer their viewing system, there are few technical advantages to the DSLR design.

Beginner cameras

Ready to step up to a 'proper' camera? Matthew Richards weighs up the options

There's no denying that most smartphones can take high-quality photos, and are easily pocketable. But if you want to get serious about photography, they're a poor substitute for a proper camera. The latest models come in a baffling array of shapes and sizes, from super-skinny compacts to chunky kits with hefty price tags. So what's the best fit for you?

A good beginner's camera should be simple and intuitive, enabling you to get great results straight out of the box. However, it should also be sufficiently advanced in terms of features and specifications that it can grow with you as you learn new tricks and techniques.

Ultimately, a 'system camera' with a few sophisticated functions in reserve, and that enables you to add extra lenses and accessories to your kit as you go along, should prove ideal. There are some great beginner-friendly SLRs and mirrorless cameras on the market right now, so let's find the best buys...

THE CONTENDERS

1	Canon EOS 2000D/Rebel T7 + 18-55mm IS II lens	£399/$499
2	Canon EOS 850D/Rebel T7i + 18-55mm IS STM	£799/$749
3	Fujifilm X-T200 + XC 15-45mm OIS PZ	£749/$699
4	Nikon Z 30 + Nikkor Z DX 16-50mm VR	£649/$609
5	Nikon Z 50 + Nikkor Z DX 16-50mm VR	£749/$859
6	Olympus OM-D E-M10 III + 14-42mm EZ	£629/$699
7	Panasonic Lumix DMC-G7 + 14-42mm Mega OIS	£499/$498
8	Sony Alpha 6600 + 16-55mm G	£1399/$1399

Shutterstock / Matt Gibson

BRIGHTON PIER

Canon
EOS 2000D
CANON ZOOM LENS EF-S 18-55mm 1:3.5-5.6 IS II

Canon EOS 2000D

£399/$499

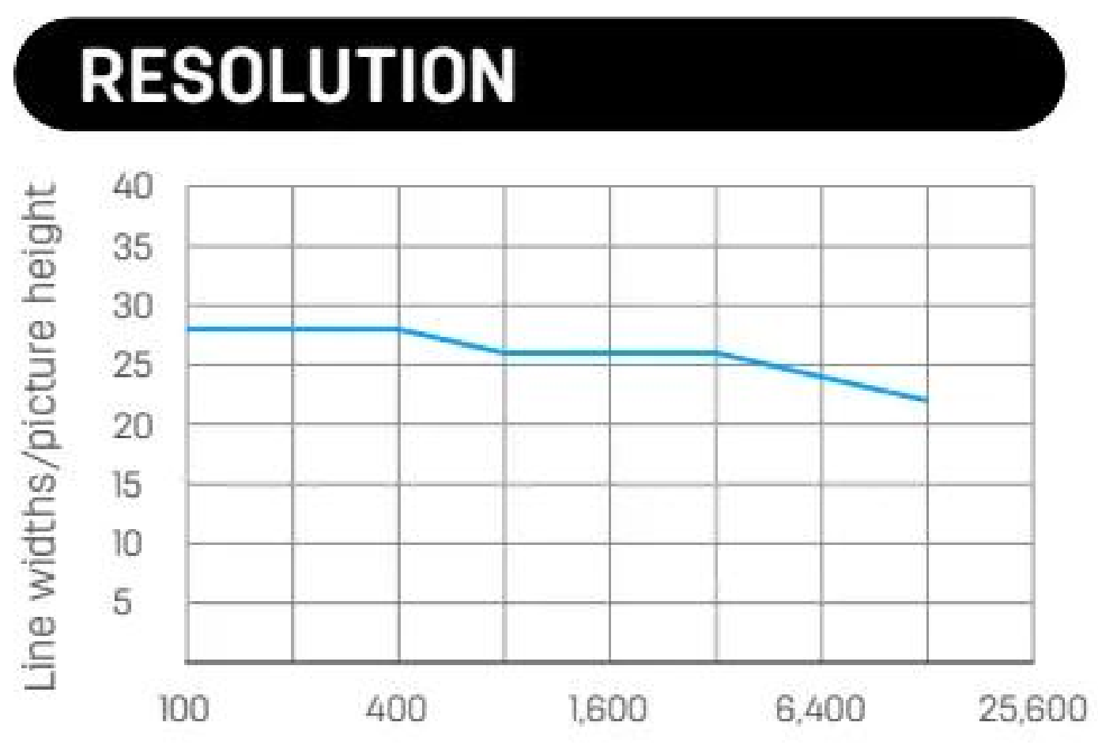
Certainly an inexpensive SLR

IN a classic case of the second-cheapest option being a better deal, this is a much better camera than Canon's more basic 4000D/Rebel T100. Upgrades include a dioptre adjustment for the viewfinder, a metal rather than plastic lens mount ring, plus a higher-resolution image sensor and LCD screen. The basic kit lens gains image stabilisation.

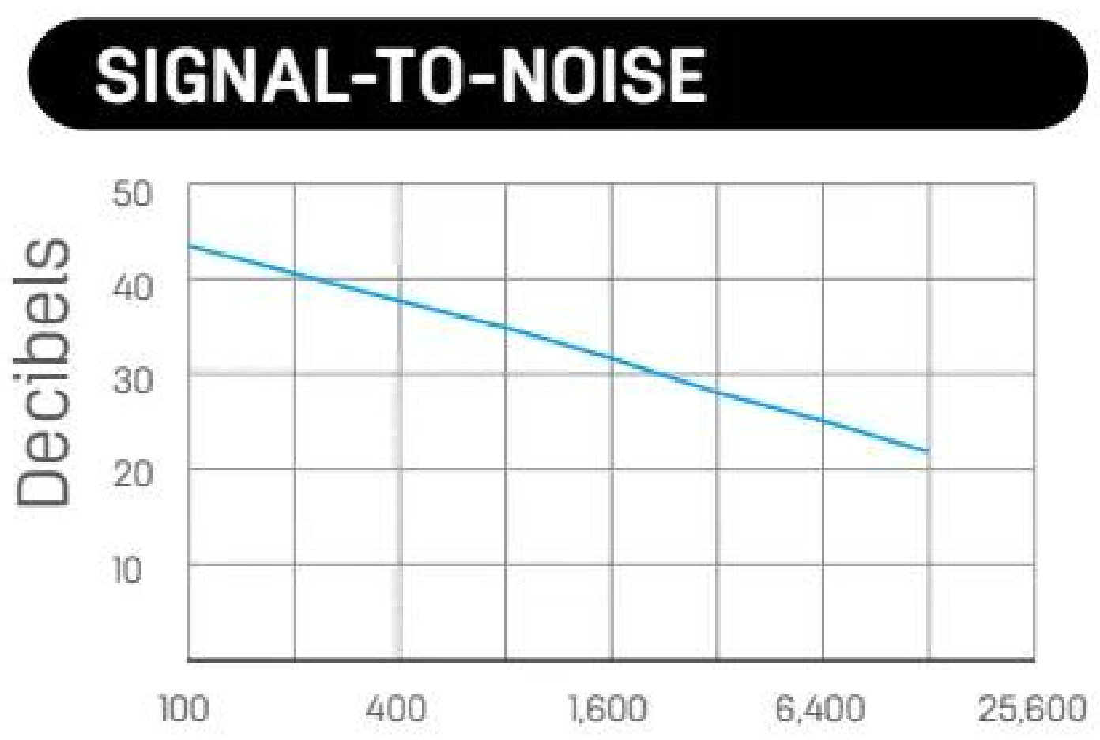
A feature guide helps beginners get on terms with camera settings and the Creative Auto shooting mode offers a stepping stone from fully automatic modes to semi-automatic and manual modes. There's also a decent range of creative filters.

Performance

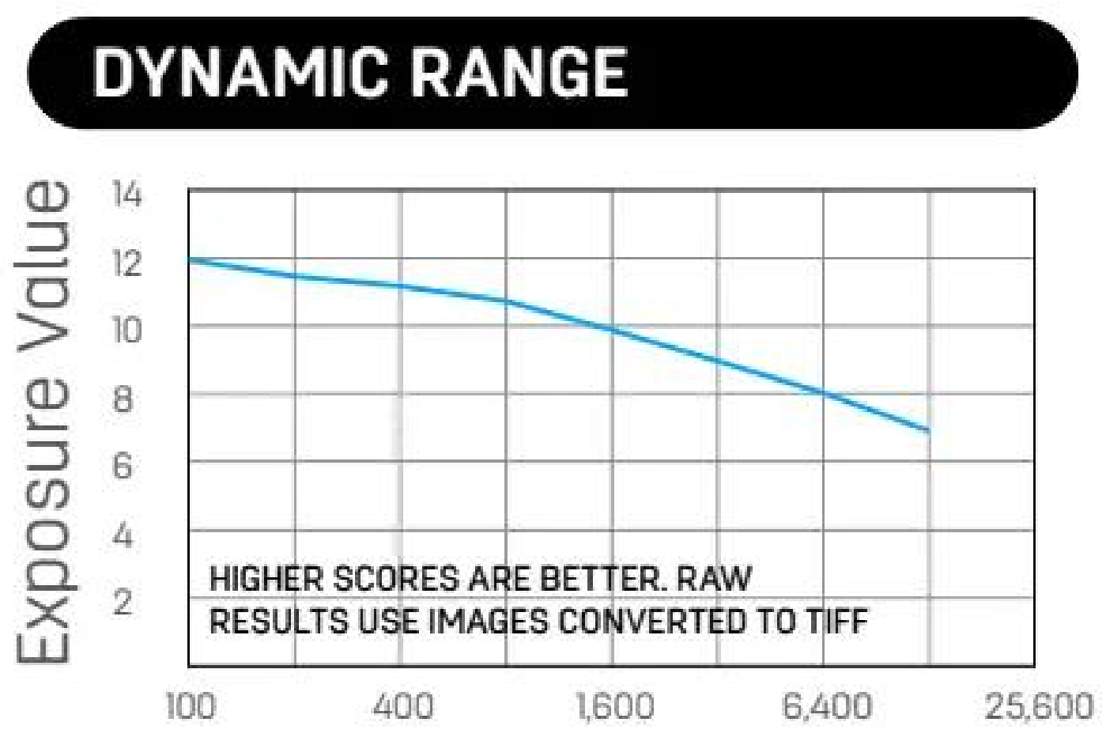
The autofocus system has just nine AF points, of which only one is cross-type, able to resolve detail in both horizontal and vertical planes. Even so, autofocus and metering are both pretty accurate. For shooting under very low lighting, the sensitivity range is disappointing, at just ISO 100-6,400 in standard trim.


RESOLUTION

It matches the 800D for resolution at low to medium sensitivity settings.


SIGNAL-TO-NOISE

It's noticeably noisier than the Canon 800D, and the ISO range is quite limited.


DYNAMIC RANGE

HIGHER SCORES ARE BETTER. RAW RESULTS USE IMAGES CONVERTED TO TIFF

At low ISO settings, dynamic range lags behind that of the Canon 800D.

VERDICT	
FEATURES	★★★☆☆
BUILD & HANDLING	★★★☆☆
PERFORMANCE	★★★½☆
VALUE	★★★½☆
OVERALL	★★★½☆

Canon
EOS 850D
CANON ZOOM LENS EF-S 18-135mm 1:3.5-5.6 IS USM

Canon EOS 850D

£799/$749

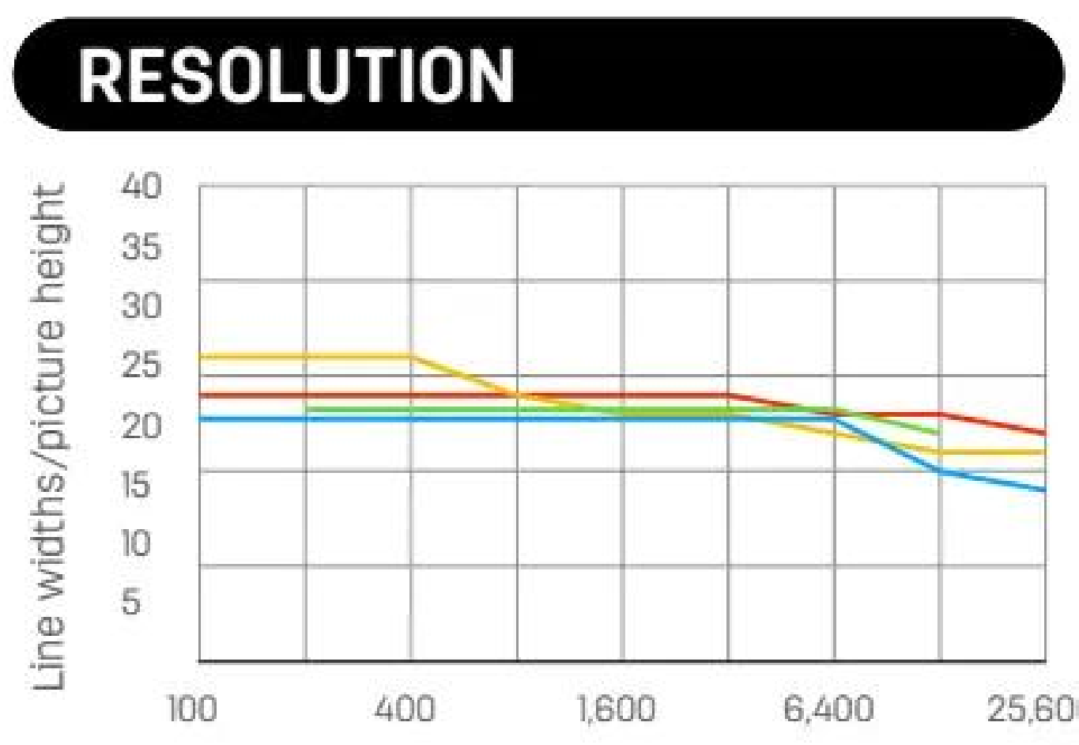
A well-equipped all-rounder

A SMALL DSLR body equipped with next-level technology and features make the Canon EOS 850D/ Rebel T8i a great option for beginners to upgrade their camera to. The EOS 850D is a lightweight, versatile and connected DSLR, powered by Canon's fast DIGIC 8 processor, and it is also capable of 7fps continuous shooting.

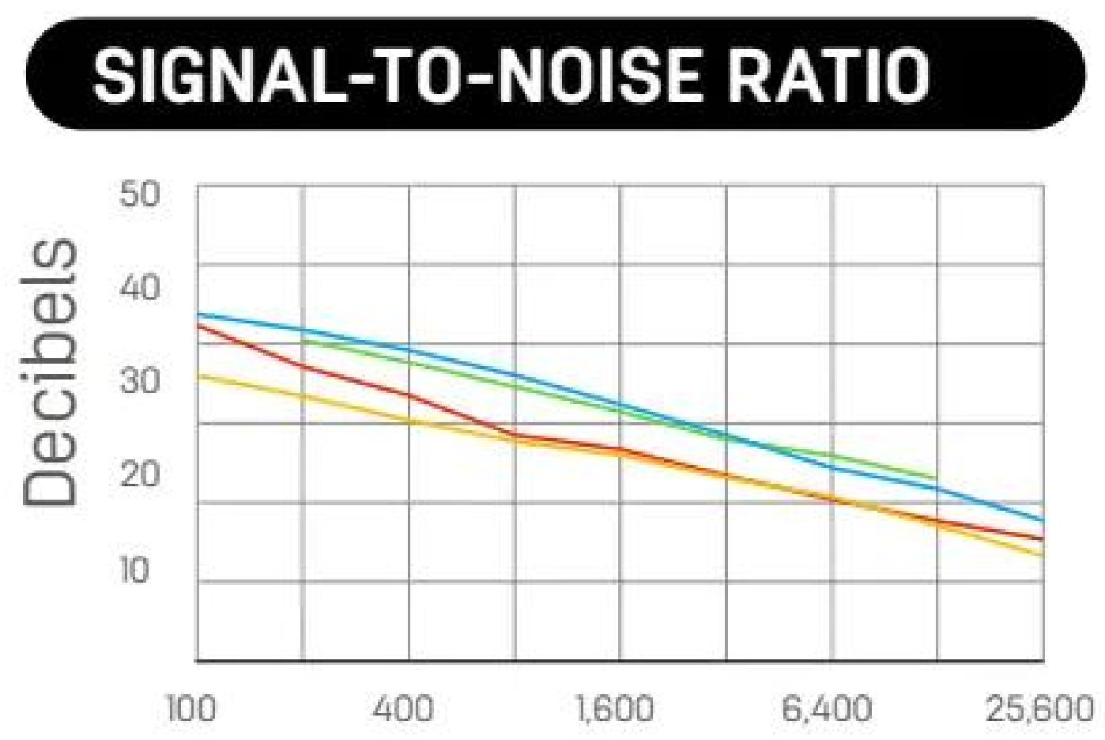
It has Canon's favourite APS-C crop-camera 24.1-megapixel Dual Pixel CMOS sensor, but what sets the 850D apart from other DSLRs in its range is the big-boy 4K movie capability and, new to this EOS line and the 850D, Intelligent Tracking (iTR) autofocus technology.

Performance

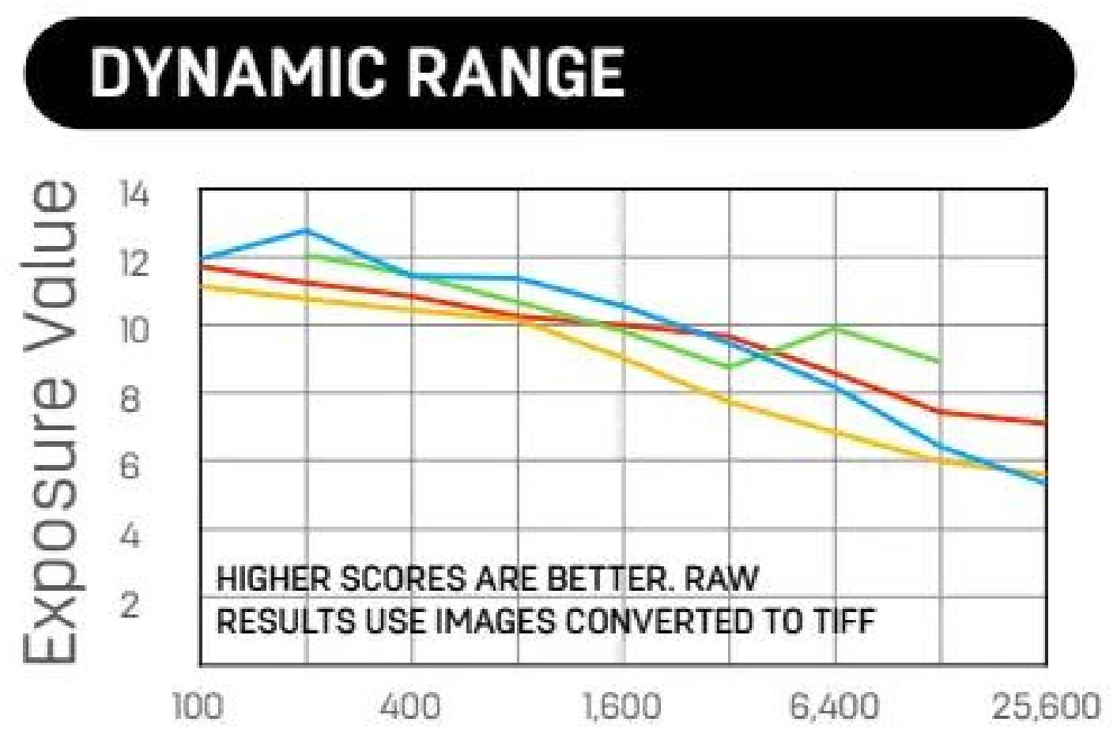
A powerful DSLR that captures detailed, colourful and sharp images, as well as HD movies. What's really exciting about the 850D, as inherited from Canon's professional camera range, is it's equipped with an Intelligent Tracking (iTR) autofocus, thanks to the 220,000 Pixel RGB+IR metering sensor. This makes the 850D's AF faster and more accurate, making it the perfect choice for capturing action.


RESOLUTION

It's good at low to medium ISO settings and retains resolution at high sensitivities.


SIGNAL-TO-NOISE RATIO

Slightly softens images and noise, producing clear images with less grain.


DYNAMIC RANGE

HIGHER SCORES ARE BETTER. RAW RESULTS USE IMAGES CONVERTED TO TIFF

Dynamic range is strong at lower ISO settings and remains very good.

VERDICT	
FEATURES	★★★★½
BUILD & HANDLING	★★★★☆
PERFORMANCE	★★★★½
VALUE	★★★★☆
OVERALL	★★★★☆

Fujifilm X-T200

£749/$699

Between basic and more advanced

FUJIFILM is perhaps best known for its classically designed X-series cameras, with external exposure controls and traditional handling. It also makes entry-level mirrorless cameras in its X-A range, designed for first-time users and smartphone upgraders. The X-T200 sits right in the middle between these two camera ranges, with simplified controls for novices, while still providing an electronic viewfinder like the more advanced models.

The X-T200 is a compelling camera and it's technically far superior to the X-T100. It feels as if it has shifted away from low-cost stills capture and more towards video, however, which has pushed the price up.

Performance

For stills photography, the touch AF and touch shutter options are really useful. The AF performance in burst and video modes seemed a little more hit and miss. The digital gimbal is a nice idea. It works, we presume, by shifting frames to keep subjects centred, but only works for Full HD video.

RESOLUTION

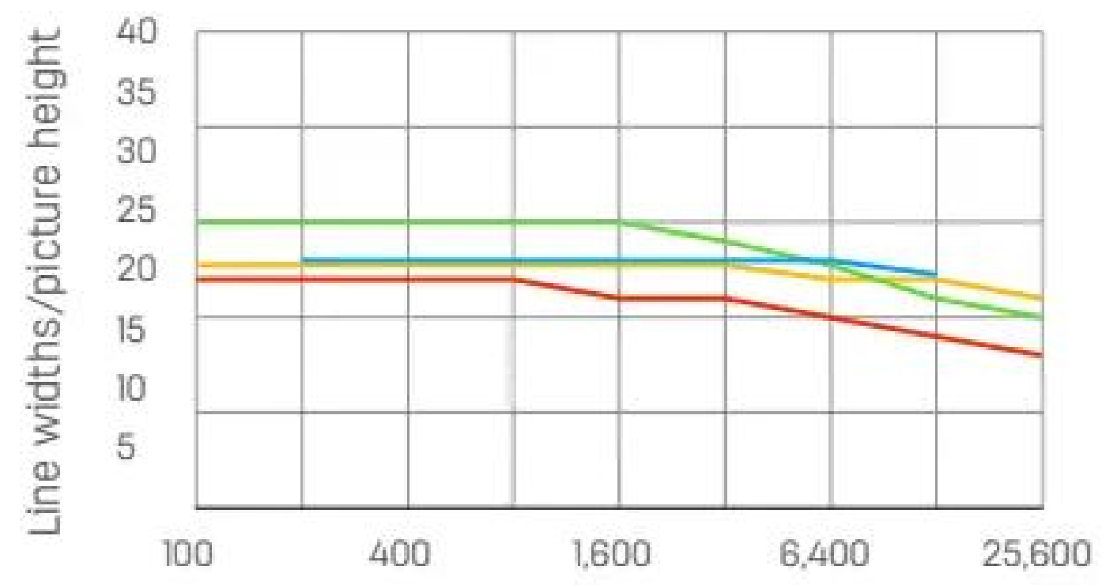
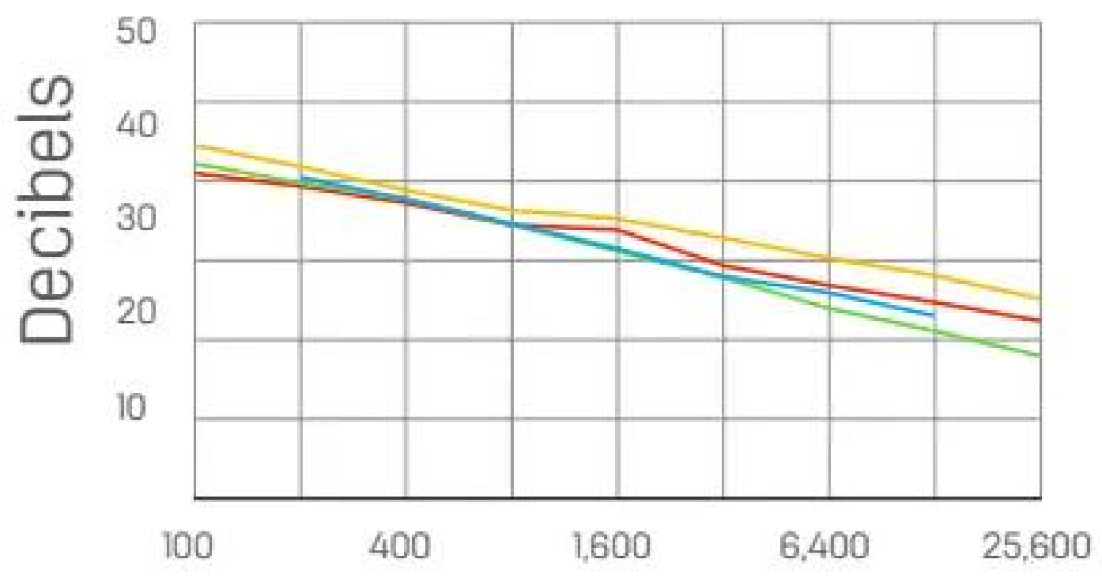


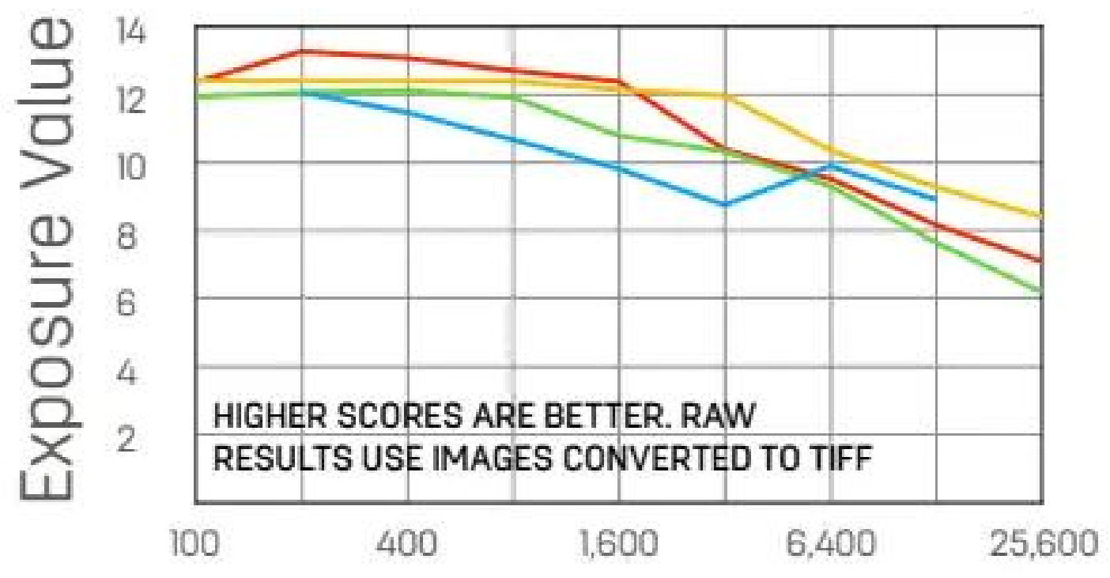
Image quality proved to deliver everything we expect from Fujifilm cameras nowadays.

SIGNAL-TO-NOISE RATIO



Fine textural detail does start to smooth over at very high ISOs (visible at ISO

DYNAMIC RANGE



Raw retains fine detail, but can't compete with JPEGs for saturation and noise control.

VERDICT

FEATURES	★★★★☆
BUILD & HANDLING	★★★★☆
PERFORMANCE	★★★★☆
VALUE	★★★½☆
OVERALL	★★★★☆

Nikon Z 30

£649/$609

This mirrorless drops the viewfinder

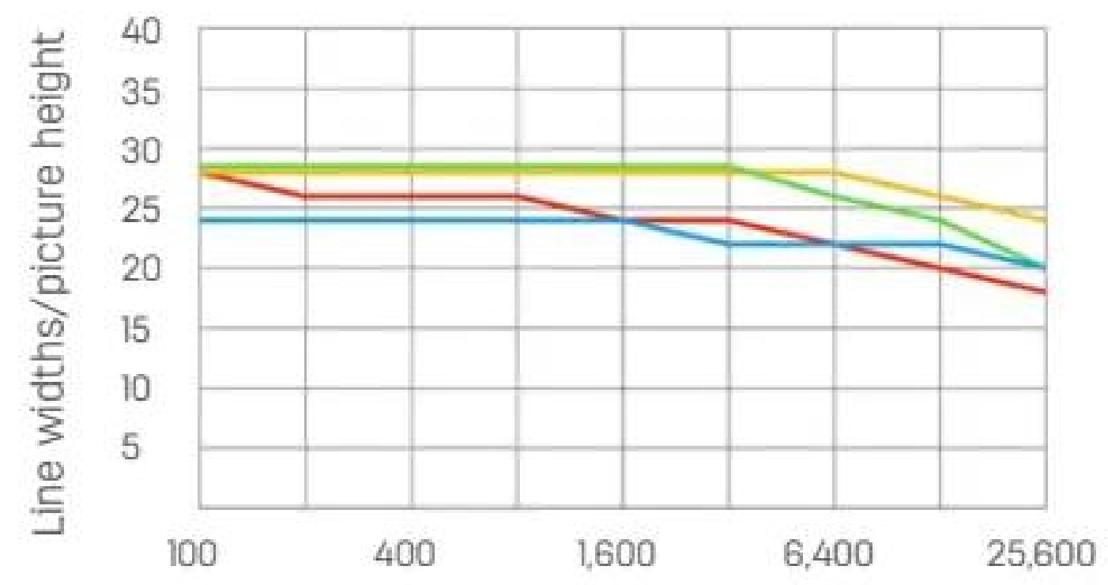
NIKON'S third mirrorless Z-series camera with a DX (APS-C) sensor has arrived in the guise of the Z 30 – this time sans-viewfinder to appeal to vloggers, and perhaps a generation of photographers. It's Nikon's cheapest Z-series mirrorless to date, largely made possible due to hardware hand-me-downs.

One of the key benefits of the Z 30 over other cameras in its class is that it provides access to Nikon's entire range of Z-mount lenses, which has delivered truly astounding optical quality.

Performance

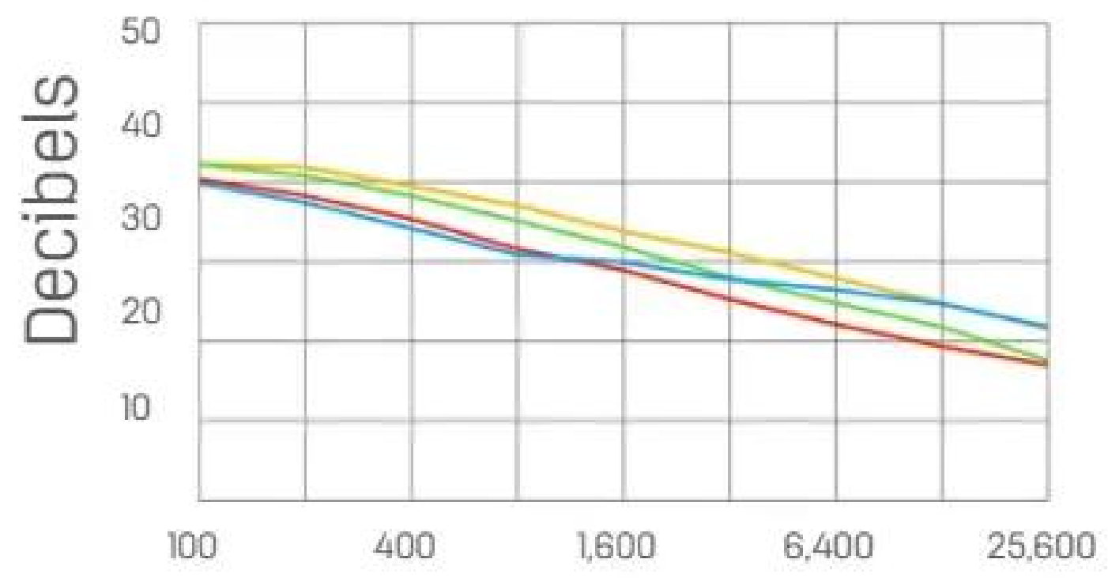
The Z 30's 20.9MP APS-C sensor can shoot down to -4.5 EV, making it a great performer in low light. While it's primarily aimed at videographers, the Z 30 is also a very capable stills camera. The Z 30 offers arguably the best build quality in its price range. But if you can't live without an EVF, or predominantly shoot stills, you could always plump for the Nikon Z 50 or Nikon Z fc.

RESOLUTION



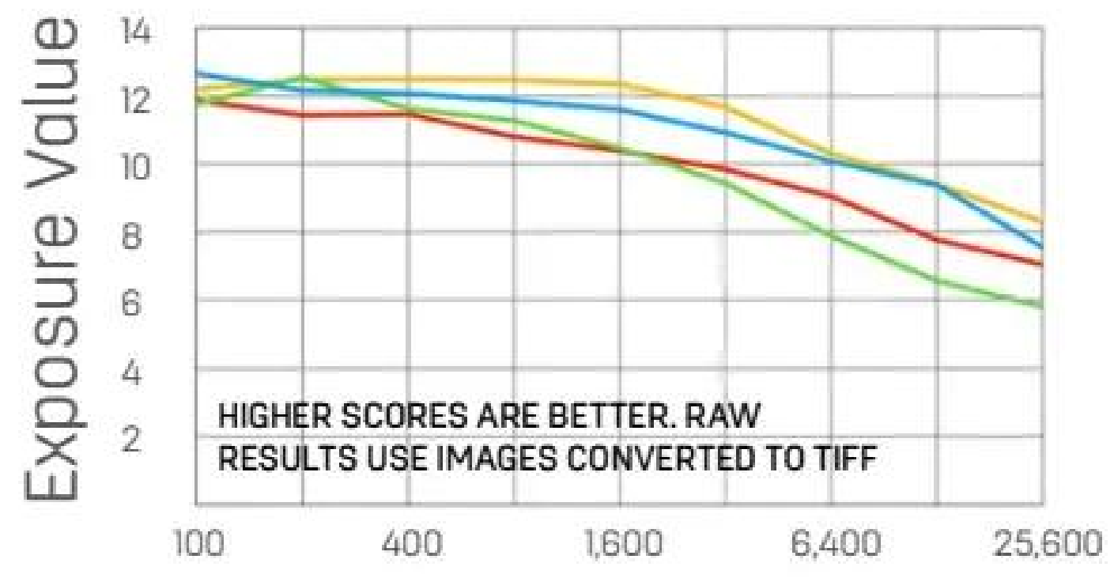
The Z 30's image quality is on a par with the Z 50 and the Z fc.

SIGNAL-TO-NOISE RATIO



Lacks at lower sensitivities, but performs best at high ISO values and produces clear results.

DYNAMIC RANGE



Captures significantly more highlight and shadow detail than competitors.

VERDICT

FEATURES	★★★☆☆
BUILD & HANDLING	★★★★☆
PERFORMANCE	★★★★☆
VALUE	★★★★★
OVERALL	★★★★☆

Nikon
DX NIKKOR 10-20mm VR
Z 50
DISP
OK
MENU

Nikon Z 50

£749/$859

Mirrorless camera for the masses

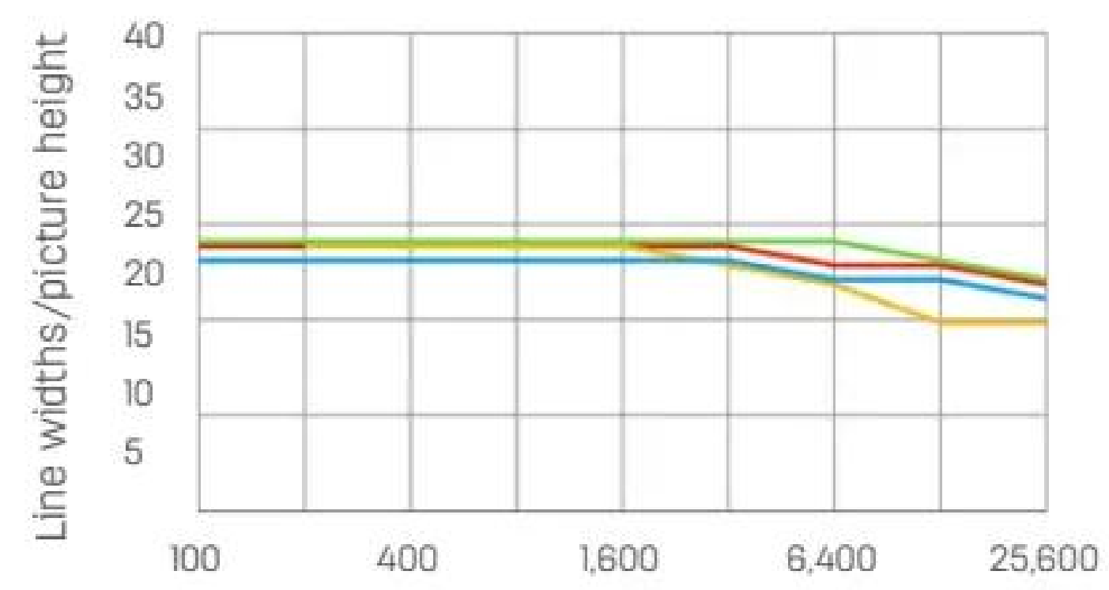
SPORTING an APS-C sensor and with 'influencer' friendly credentials, the Nikon Z 50 brings Nikon's mirrorless camera technology to the hobbyist market. The Nikon Z 50 is not just a scaled down version of the Nikon Z 6 and Z 7. Nikon has done a remarkable job of giving such a small camera such a solid one-handed grip. This is a fantastic enthusiast mirrorless camera (at an even more fantastic price), and proves that Nikon has a clear vision for its Z-mount system.

But photography isn't the Z 50's only strong point. With the ability to capture uncropped 4K video, the Z 50 is a strong contender for winning the attention of the vlogger/influencer market.

Performance

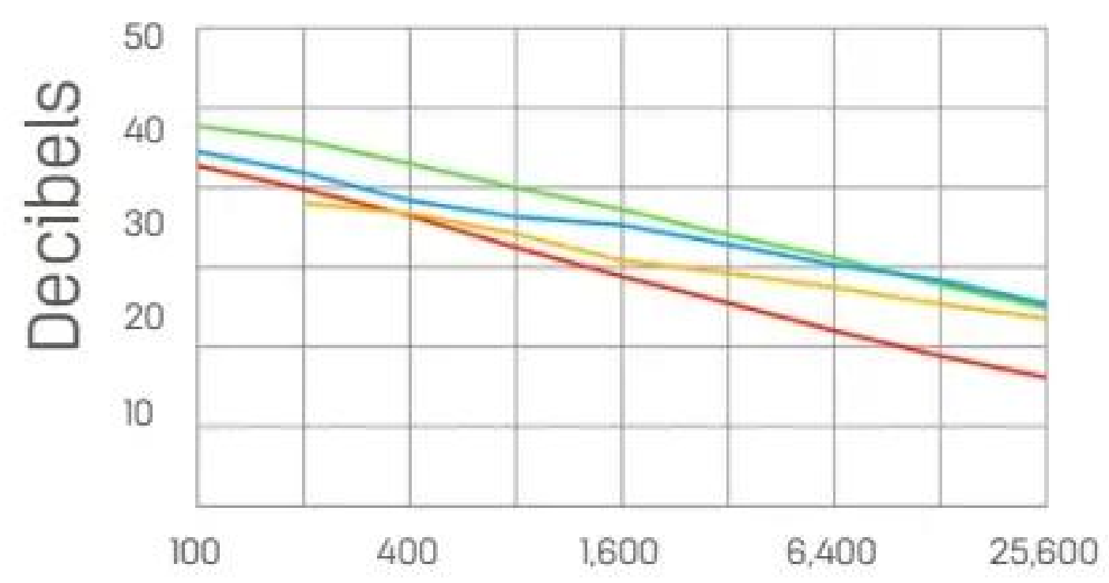
With a small, non-threatening profile – plus the incredibly useful tilting touchscreen LCD – the Z 50 is ideal for street photography. We tested out the Z 50's video functionality and were pleased with the results, including the focus peaking feature, which works just as well as it does on the Z 7.

RESOLUTION



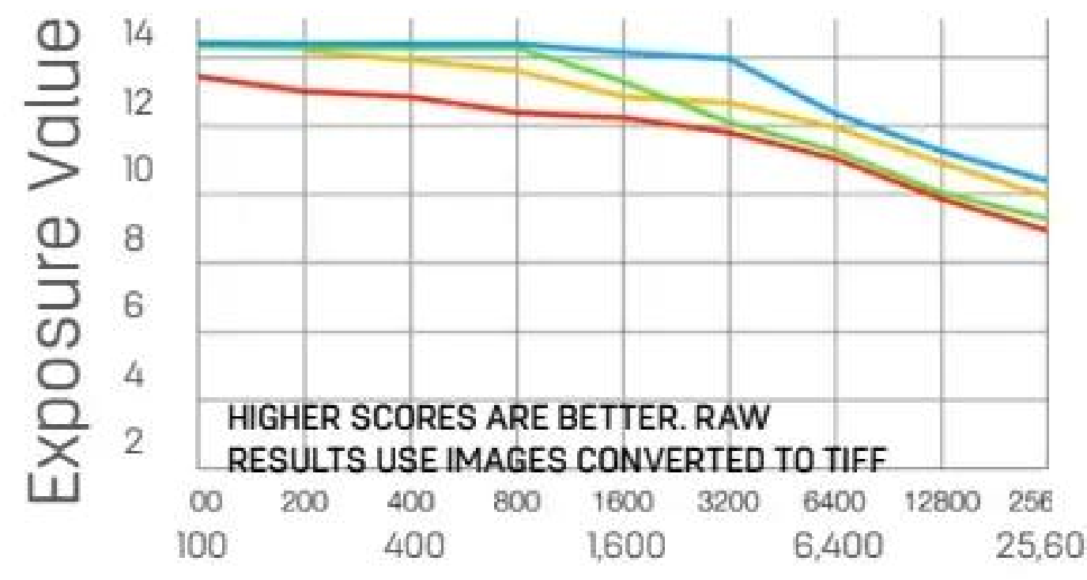
The only area of our lab tests where the Z 50 doesn't excel is resolution.

SIGNAL-TO-NOISE RATIO



Copes well and claws back ground at higher values, where image noise is more visible.

DYNAMIC RANGE



The Nikon Z 50 mirrorless scores very well for dynamic range.

VERDICT

FEATURES	★★★★½
BUILD & HANDLING	★★★★★
PERFORMANCE	★★★★★
VALUE	★★★★★
OVERALL	★★★★★

OLYMPUS
OM-D
M.ZUIKO DIGITAL 14-42mm 1:3.5-5.6
OLYMPUS
MENU
INFO
ISO
OK

Olympus OM-D E-M10 III

£629/$699

A super-slinky mirrorless model

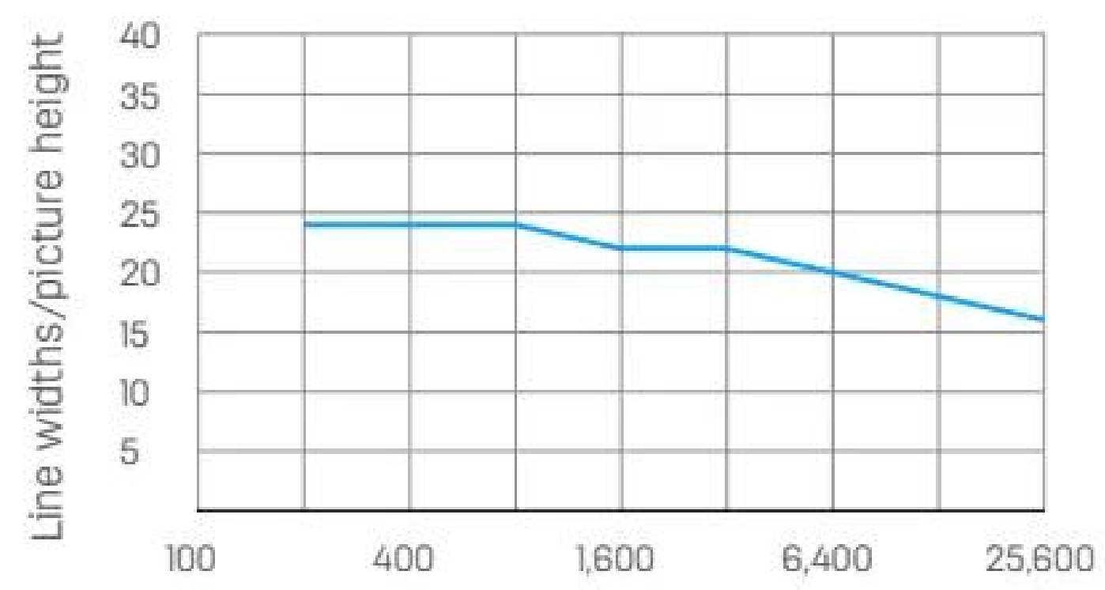
THANKS in part to its tiny retractable zoom lens, this Olympus makes a great travelling companion. It's immaculately engineered and feels a top-quality camera, complete with a good selection of tactile dials and buttons that enhance handling.

In these times of so much hype surrounding full-frame cameras, it might seem odd that Olympus and Panasonic are persevering with the Micro Two Thirds format, but the relatively small image sensor enables particularly compact cameras and lenses. A downside is that it can be a struggle to get a tight depth of field, for example when you want to blur the background in portraiture.

Performance

Clever tricks include Live Bulb and Live Time modes for updating the LCD display during long exposures, so you can literally see what you're going to get. There's a fast 8.6fps burst rate on hand for sportier shooting, although autofocus tracking can be hit and miss.

RESOLUTION



The Olympus is an under-achiever for resolution, mostly due to its 16.1MP sensor.

SIGNAL-TO-NOISE RATIO

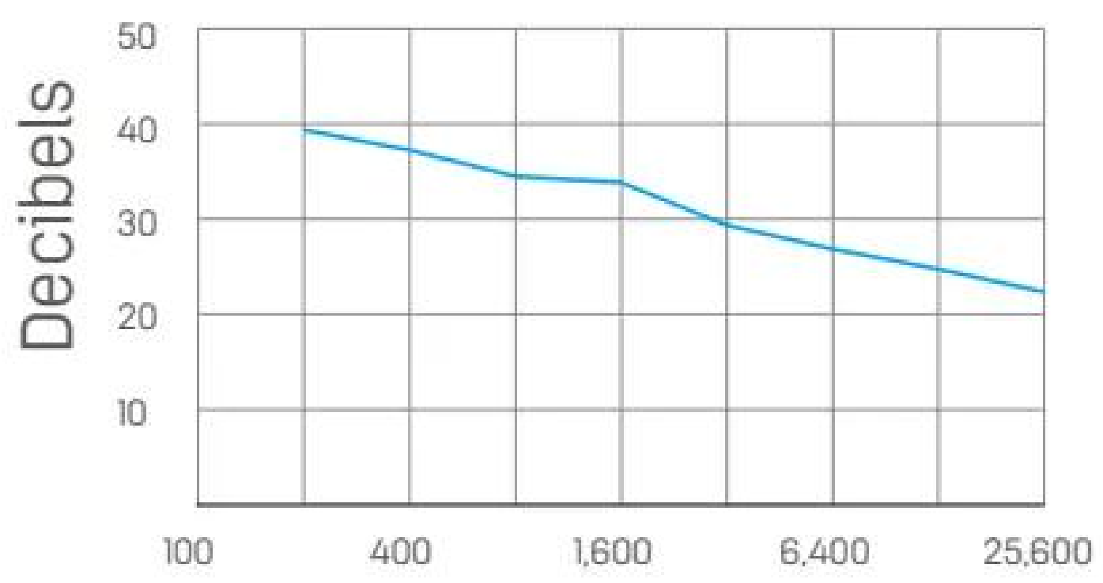
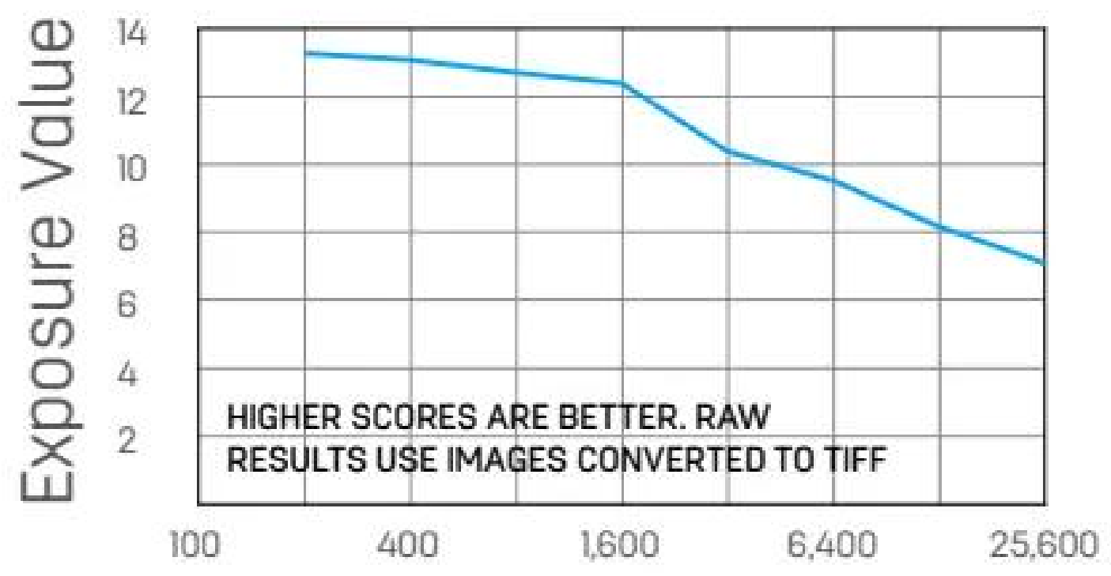


Image noise at high ISOs is a little more noticeable than from any other camera here.

DYNAMIC RANGE



This camera is a high-flyer for dynamic range, with some of the best lab scores here.

VERDICT

FEATURES	★★★★☆
BUILD & HANDLING	★★★★½
PERFORMANCE	★★★★½
VALUE	★★★★☆
OVERALL	★★★★½

Panasonic Lumix DMC-G7

£499/$498

Good specs and a sensible price

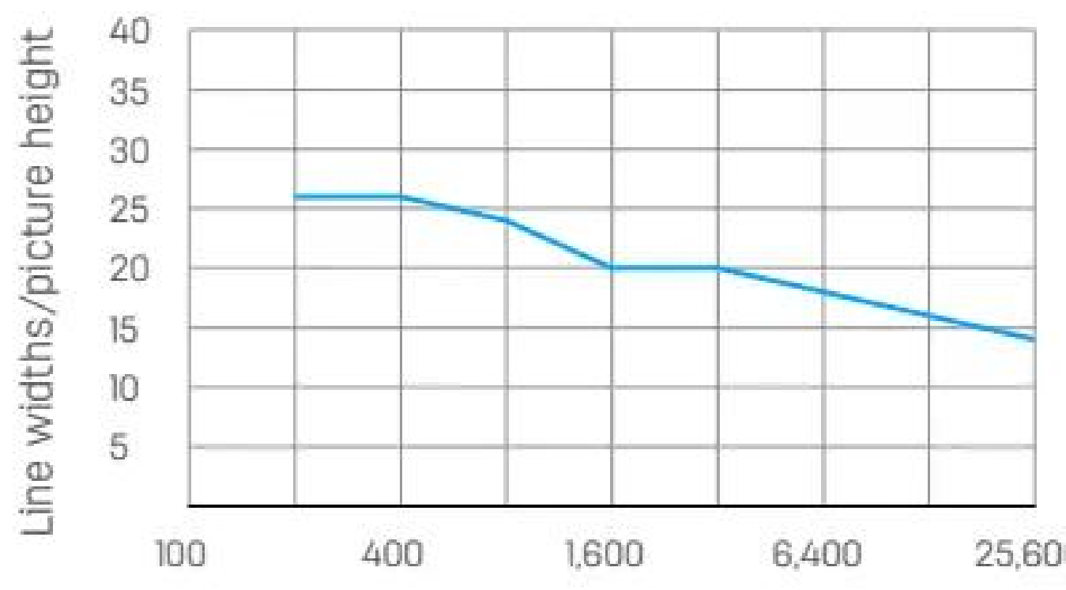
ALTHOUGH it undercuts the Olympus E-M10 III for price, the G7 has a similar set of core features. Both share a 16MP Four Thirds image sensor, a 2,360k electronic viewfinder and a 3-inch 1,040k-dot touchscreen. (Here it's articulated rather than just tilting.)

Notable differences include a two-minute Bulb exposure time: it's 30 minutes with the Olympus. The Panasonic also lacks the Olympus's sensor-shift image stabiliser, instead packing optical stabilisation into its kit zoom lens. The body is also bigger, although both cameras weigh in at 410g with battery and memory card.

Performance

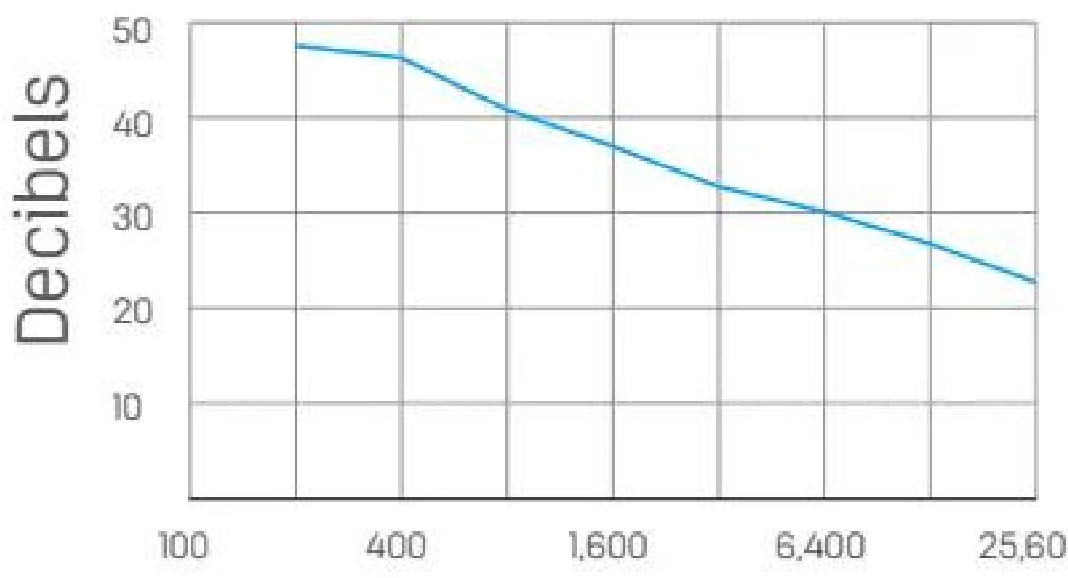
Like most Panasonic cameras, the G7 is adept at shooting movies as well as stills. The contrast-detection autofocus system has fewer selectable points than in the Olympus camera, but is a little better at tracking moving objects. The camera can feel a little confusing for beginners, with its plethora of dials and five custom function buttons.

RESOLUTION



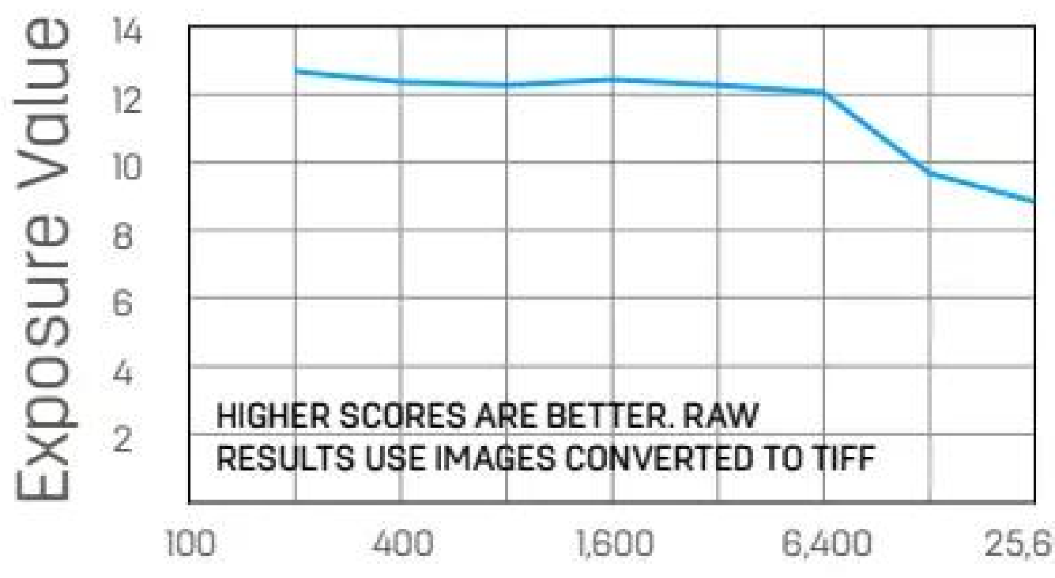
The Panasonic G7 retains a little more resolution than the Olympus E-M10 III.

SIGNAL-TO-NOISE RATIO



Impressive for a Four Thirds camera, images look detailed with fairly minimal noise.

DYNAMIC RANGE



Dynamic range isn't quite as excellent as from the E-M10 III, but it's still pretty good.

VERDICT	
FEATURES	★★★★☆
BUILD & HANDLING	★★★★☆
PERFORMANCE	★★★★☆
VALUE	★★★★½
OVERALL	★★★★☆

Sony Alpha 6600

£1,399/$1,399

Range-topping model

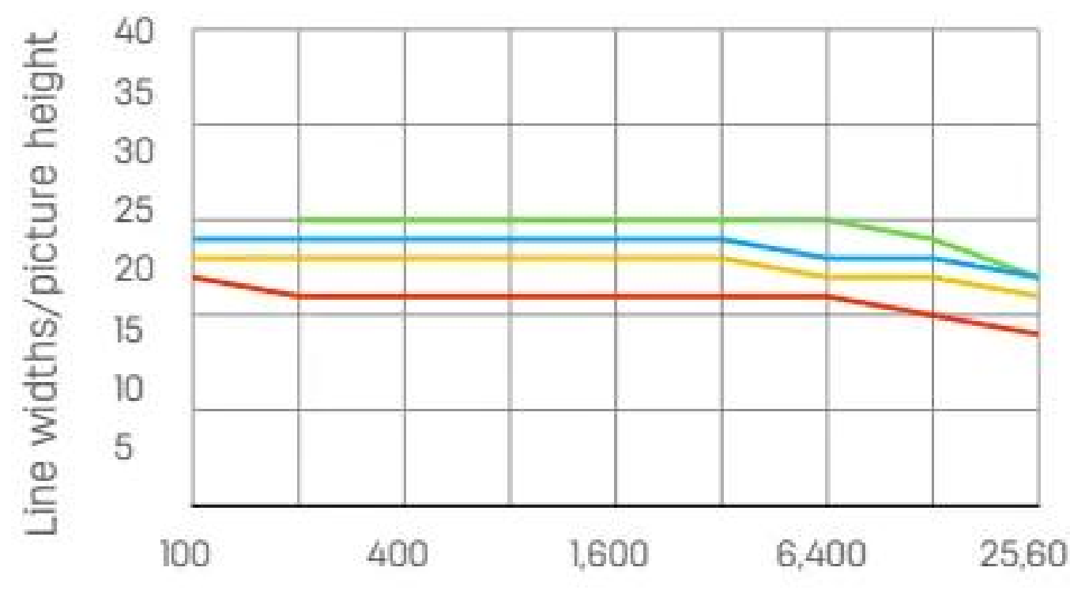
DESIGNED to withstand a little more than other Sony APS-C cameras, the A6600 is equipped with Sony's step-up NP-FZ1000 battery, which effectively doubles battery life to about 720 shots. At the heart of the A6600 is Sony's venerable 24.2MP APS-C sensor. We've seen it before in previous A6000-series cameras, and even the entry-level A6100 shares the same sensor and Sony's Bionz X processor. This is no bad thing, as both come together to produce excellent quality.

The 0.02-second autofocus with Real-Time Tracking, Autofocus and Real-time Eye AF recognises eyes in humans/animals to automatically keep them in focus. 11fps burst shooting is impressive, as are the A6600 video features.

Performance

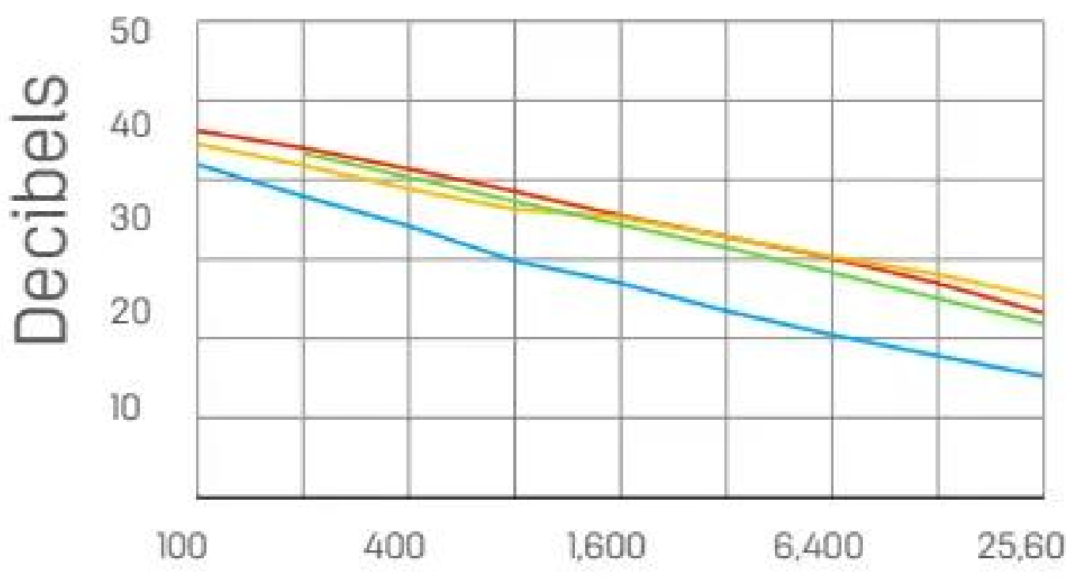
The Real-time Tracking autofocus technology impressed most of all. The system is able to track a subject and focus on them even when they turn away. The stunning AF and image stabilisation make it suitable for demanding stills work, but its still image quality is good rather than class-leading.

RESOLUTION



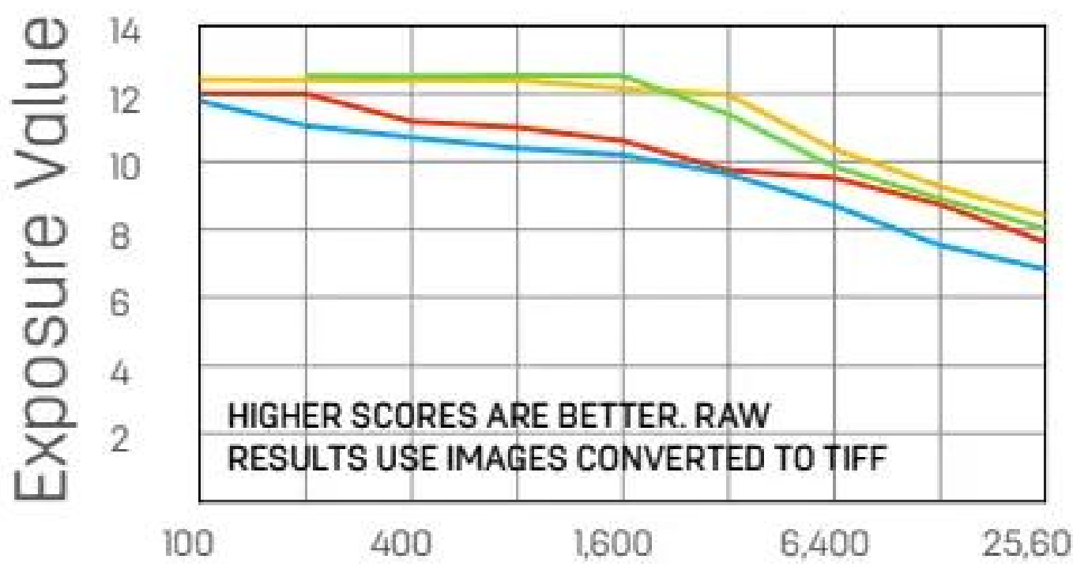
With 24.2MP, the Sony A6600 is beaten by the 26.1MP Fujifilm X-T3 for resolution.

SIGNAL-TO-NOISE RATIO



With high ISO noise reduction set to Low, shots at ISO 6400 remain clean.

DYNAMIC RANGE



Its sensor falls short compared to the Z 50 and Fujifilm X-T3, despite its many new features.

VERDICT	
FEATURES	★★★★★
BUILD & HANDLING	★★★★☆
PERFORMANCE	★★★★☆
VALUE	★★★★☆
OVERALL	★★★★☆

THE VERDICT

Canon commands the camp

The Canon EOS 800D is an ideal beginner's camera

Canon
EOS 800D
Digital Camera
★★★★★
BEST ON TEST

BEGINNERS are really spoilt for choice these days when they select their first camera. The Canon EOS 2000D and Nikon D3500 are both good, attractively priced options, the Nikon stealing a lead with its interactive Guide mode. However, they're both less sophisticated than other cameras on test, and you might soon find yourself wanting to trade up to a more exotic model. With this in mind, we'd go for the Canon EOS 800D. It's dead easy to get up and running with, thanks to its great Guide interface, yet has seriously smart functions and features on hand for you to grow into.There are some seriously good mirrorless cameras on the market as well. Our current favourite for a beginner-level model is the Fujifilm X-T100, which rivals pricier SLRs for performance and offers standout value. The Olympus OM-D E-M10 III is more expensive but particularly well-suited to travel photography, with its dinky kit lens. The Panasonic Lumix G7 is also very capable, although its control system can prove a little less intuitive for beginners, while the Sony Alpha 6000 is particularly well-suited to action photography, thanks to its advanced autofocus system and fast burst rate.

HOW THE CAMERAS COMPARE

	Canon **EOS 2000D**	**Canon** **EOS 850D**	**Fujifilm** **X-T200**	**Nikon** **Z 30**	**Nikon** **Z 50**	**Olympus** **OM-D E-M10 III**	**Panasonic** **DMC-G7**	**Sony** **Alpha 6600**
Contact	www.canon.co.uk	www.canon.co.uk	www.fujifilm.co.uk	www.nikon.co.uk	www.nikon.co.uk	www.olympus.co.uk	www.panasonic.co.uk	www.sony.co.uk
Street price	£399/$499	£799/$749	£749/$699	£649/$609	£749/$859	£629/$699	£499/$498	£1,399/$1,399
Camera type	SLR	SLR	Mirorless	Mirrorless	Mirrorless	CSC	CSC	Mirrorless
Image sensor	24.1MP CMOS APS-C	24.1MP CMOS APS-C	24.2MP CMOS APS-C	20.9MP CMOS APS-C	20.9MP CMOS APS-C	16.1MP Live MOS, MFT	16.0MP Live MOS, MFT	24.2MP CMOS APS-C
Image processor	Digic 4+	Digic 8	Fujifilm	Expeed 6	Expeed 6	TruePic VIII	Venus Engine	Bionz X
Lens mount	Canon EF-S	Canon EF-S	X-mount	Nikon Z	NikonZ	Micro Four Thirds	Micro Four Thirds	E-mount
Viewfinder	Pentamirror	Pentamirror	Electronic (2,360k)	None	Electronic (2,360k)	Electronic (2,360k)	Electronic (2,360k)	Electronic (2,359k)
ISO range (expanded)	ISO 100-6400 (12,800)	ISO 100-25,600 (51,200)	ISO 200-12,800 (100-51,200)	ISO 100-51,200 (204,800)	ISO 100- 51,600 (204,800)	ISO 200-25,600 (100)	ISO 200-25,600 (100)	ISO 100-32,000 (102,400)
Autofocus	9-point, phase AF	45-point, phase AF	425-point, phase AF	209-point, hybrid AF	209-point, phase AF	121-points, contrast AF	49-point, contrast AF	425-point, phase AF
Shutter speeds	1/4000-30 sec, Bulb	1/4000-30 sec, Bulb	1/32,000-30 sec, Bulb	1/4000-30 sec, Bulb	1/4000-30 sec, Bulb	1/16,000-60 sec, Bulb (30m)	1/16,000-60 sec, Bulb (2m)	1/4000-30 sec, Bulb
Stabilisation	Via lens	Five-axis (video only)	Via lens	Via lens	Via lens	Sensor-shift, five-axis	Via lens	Five-axis
Battery life (Cipa)	500 shots	800 shots	450 shots	400 shots	320 shots	330 shots	350 shots	810 shots
Max burst rate	3fps	7.5fps	8fps	11fps	11fps	8.6fps	8fps	11fps
Video - max resolution	1080p	4K	4K	4K	4K	4K	4K	4K
LCD screen	3.0-inch, 920k, fixed	3.0-inch, 1040k, vari-angle, touch	3.5-inch, 2,760k, vari-angle, touch	3.0-inch, 1040k, tilt, touch	3.2-inch, 1,04k, tilt, touch	3.0-inch, 1040k, tilt, touch	3.0-inch, 1040k, pivot, touch	3.0-inch, 922k, tilt
Body (WxHxD, weight)	129 x 101 x 78mm, 475g	131 x 103 x 76mm, 515g	121 x 84 x 55mm, 370g	128 x 73,5 x 59,5mm, 405g	127 x 94 x 60mm, 396g (body only)	122 x 84 x 50mm, 410g	125 x 86 x 77mm, 410g	120 x 67 x 69mm, 503g
FEATURES	★★★☆☆	★★★★½	★★★★☆	★★★½☆	★★★★½	★★★★½	★★★★☆	★★★★★
BUILD & HANDLING	★★★☆☆	★★★★☆	★★★★☆	★★★★½	★★★★★	★★★★½	★★★★☆	★★★★☆
PERFORMANCE	★★★½☆	★★★★½	★★★★☆	★★★★☆	★★★★★	★★★★½	★★★★☆	★★★★☆
VALUE	★★★½☆	★★★★☆	★★★½☆	★★★★☆	★★★★★	★★★★☆	★★★★½	★★★★☆
OVERALL	★★★½☆	★★★★☆	★★★★☆	★★★★☆	★★★★★	★★★★½	★★★★☆	★★★★☆

CAMERA NECK STRAPS

Five straps that offer extra comfort and features over a bundled neck strap

www.blackrapid.com

BlackRapid Binoc Breathe Strap

£40/$40

While it's billed as a strap for binoculars, this neck strap will attach to a camera equally easily. Its unique feature is a breathable, stretchy and very flexible neck pad. It also folds small and can be detached quickly, but the price still seems high next to the Matin strap.

OVERALL ★★★★☆

Digital Camera ★★★★★ BEST ON TEST

Digital Camera ★★★★★ GOLD AWARD

Digital Camera ★★★★★ GREAT VALUE

www.cameraclean.co.uk

Matin Neoprene Comfort Strap

£16/$24

Based around a thick and highly flexible neoprene neck pad, which stretches slightly to better suspend a heavy load, Matin's entry gets top marks for value. A textured rubber coating on the underside adds comfort and is easily cleaned. Two quick-release clips mounted close to your camera leave unobtrusively short sections of strap attached if the neck piece is removed, and these can be joined to form a compact hand strap.

OVERALL ★★★★★

www.optechusa.com

OpTech Pro Loop Strap

£19/$22

This well priced strap features a 6cm-wide neoprene neck pad that really spreads a load, although its square-cut edges can rub. Two clips will detach the pad, leaving the connected ends able to join and form a hand strap, albeit one that's on the long side.

OVERALL ★★★★☆

www.peakdesign.com

Peak Design Slide Strap

£55/$60

A sling, shoulder and neck strap in one, the Slide exudes quality with a seatbelt-style strap and premium fittings, which include clever quick-release buttons to detach the strap. This is far from the most compact strap, though, making it tricky to squeeze into a tight kit bag.

OVERALL ★★★★½

www.thinktankphoto.com

Think Tank Camera Strap v2.0

£23/$27

It's the most compact strap here, but that's down to a narrow design that's no wider or more comfortable than a standard neck strap. A grippy coating on both sides lets this double as a shoulder strap, and extra hardware can connect it to backpack straps.

OVERALL ★★★½☆

Canon
EOS
R7
CANON LENS RF-S18-150mm F3.5-6.3 IS STM
φ55mm
MF
AF

CSC www.canon.co.uk

Canon EOS R7

£1,449/$1,499

The APS-C camera you've been waiting for? James Artaius explores the latest R-series model and finds that it combines unparalleled speed and resolution

The Canon EOS R7 is a camera we've been waiting for since the launch of the R system back in 2018. The anticipated first APS-C member of the EOS R family, it asks questions of the (distinctly much smaller and more compact) EOS M system but gives Canon the most powerful APS-C camera on the market.

Offering speed that matches (and mechanically, beats) the Canon EOS R3 and a resolution that is second only to the Canon EOS R5, the Canon EOS R7 is a technical marvel. Following in the footsteps of the EOS 90D and EOS 7D Mark II DSLR cameras, shooters will be able to leverage its 1.6x crop factor to amplify the effective focal length of full-frame lenses.

The R7 is built around a 32.5MP APS-C sensor that packs more resolution than any cropped sensor camera on the market apart from the Fujifilm X-T5 and Fujifilm X-H2, which is something that will come as music to the ears of wildlife photographers and birders, always keen for more freedom to crop in.

Although it's not a completely new sensor – it's built on the same architecture as the 32.5MP sensor in the EOS 90D and EOS M6 Mark II – it features an optimised wiring layer and microlens technology to deliver improved signal readout. It also has staggering shooting speeds of 15 frames per second mechanically (faster than any other Canon EOS camera, including the R3, R5 and R6) and 30 frames per second electronically, which matches the R3, Sony A1 and Nikon Z8/Z9, unless you factor in the latter's 11MP crop mode.

This is Canon's first APS-C camera to feature in-body image stabilisation – a five-axis system that delivers up to eight stops of compensation, depending on the lens (for example, it offers seven stops on the new Canon RF-S 18-150mm f/3.5-6.3 IS STM). The R7 is smaller and lighter than the 90D, offering a compact chassis that's still reassuringly chunky thanks to its thick grip. It also features the same weather-sealing as the 90D, along with dual UHS-II SD memory card slots.

Perhaps more than any other R system camera, it feels most like the EF body it's replacing when held and used, with the familiar grammar of the EOS menu system

> *"The R7 feels most like the EF body it is replacing. It's like an old friend and a natural way to graduate from a DSLR"*

Features

APS-C format sensor
A 32.5MP crop-frame sensor with a 1.6x magnification factor adds versatility to telephoto lenses.

Dual Pixel AF II
The R7 makes use of Canon's excellent autofocus system for accurate subject recognition and tracking functions, including for various animals and human subjects.

Electronic shutter
The mechanical shutter is speedy (1/8,000sec) but electronic mode allows up to 1/16,000 sec for faster subjects or touch exposure control.

Image stabilisation
It's Canon's first APS-C camera with IBIS and the featured system enables up to 8 stops of shake reduction with certain lenses. The IS tech works on 5-axes to minimise camera movements when shooting handheld.

Video features
The camera can shoot at 4K at 60p, 4K at 30p (oversampled 7K) and at 1080p for a slow-motion-unlocking 120p.

Lens mount
The RF mount accepts both full-frame RF and APS-C format RF-S lenses, although optics designed for Canon's other APS-C line, the EOS M system, are not compatible.

RF MOUNT

making it feel like an old friend and a natural way to graduate from a Canon DSLR. Something that may take getting used to is the arrangement of the joystick and control wheel. The latter has moved from its familiar position at the lower-right of the camera rear and now surrounds the joystick on top next to the EVF.

The control wheel is smaller and more delicate than on other EOS bodies and may occasionally threaten to feel a bit fiddly, especially if you have large thumbs. You will also need to adjust your muscle memory if you're accustomed to spinning the wheel to adjust your settings mid-shoot.

The reduced sensor size and throw of the APS-C format means that smaller, lighter lenses, such as the new Canon RF-S 18-45mm f/4.5-6.3 IS STM, can be mounted on the system. However, the Canon EOS R7 uses the same RF mount as its full-frame counterparts, which means that existing full-frame RF lenses can be used natively, while EF and EF-S lenses

AF area
Whole area AF
SET OK

x5 © Canon

x4 © James Artaius

Above Long life: The R7 comes into its own with increased focal lengths, which make it ideal for wildlife shoots

Left True blue: Dynamic range is great, but over ISO 800, the R7 struggles to keep up with its main rivals

can also be used by attaching the Mount Adapter EF-EOS R.

In many ways, shooting with the R7 really does feel like shooting with a mirrorless 90D in the sense that it's a lot sleeker and smaller, but with way more bells and whistles. The camera feels tailor-made for the RF-S 18-150mm lens (or, rather, the lens for it), and the pair make a formidable combination for run-and-gun, travel and everyday photography – and even videography. This is a great tandem for all-purpose shooting and content creation.

Dynamic range at lower sensitivities is excellent – and indeed, it's on a par with the Fujifilm X-T4 and Nikon Z5. However, at ISO 800 and above, the R7 struggles to capture as much dynamic range as its main rivals. Furthermore, despite its 32.5MP sensor being the most pixel-packed here, the R7 only ties with the 26.1MP X-T4 and 24.2MP a6600 when it comes to resolving fine detail. At really high sensitivities, the Canon even falls slightly behind the competition, due to high ISO image noise obscuring fine detail.

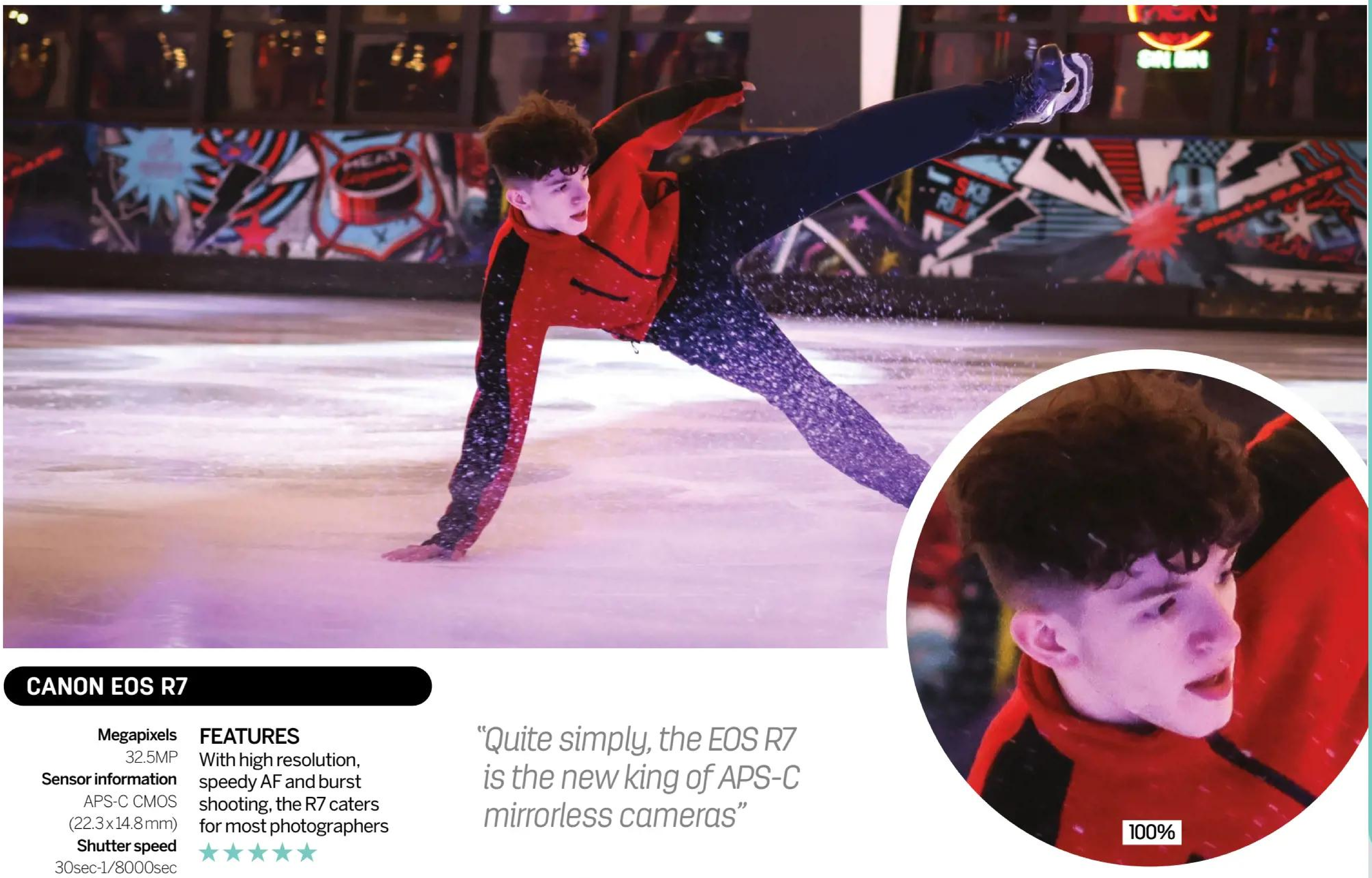
All things considered, we're impressed with what the Canon EOS R7 can do. It's lightning fast, both mechanically and electronically, the resolution offers glorious detail and the 1.6x crop factor makes your lenses even longer for shooting faraway subjects. Our lab results mean that this isn't quite a clean sweep for the Canon, but the real-world differences will be subtle and barely noticeable. Quite simply, the R7 is the new king of APS-C mirrorless cameras.

High-speed features

Where this camera really comes into its own is in its amplification of focal lengths, and how this benefits wildlife shooters. Meanwhile, the subject detection and tracking are superb, as you would expect of the Dual Pixel AF II technology. We shot a range of subjects, from fast-moving ice skaters and static models to a variety of waterfowl, and the autofocus never let us down. It was sticky and adaptive when flitting between eye, head and body detection when shooting skaters doing tricks, and was also instinctive when shooting all manner of birds waddling and swimming erratically through the frame. The AF also performs brilliantly when shooting video, not being fooled by subjects disappearing behind foreground obstructions.

While it possesses lightning-fast shooting speeds, the buffer is limited by the choice of SD cards over CFexpress, with maximum bursts hitting 46 RAW files and 184 JPEGs. However, that was still enough to get a controlled burst of shots and meant that we didn't miss anything we were aiming for.

Canon
EOS
R7
EOS



CANON EOS R7

Megapixels	32.5MP
Sensor information	APS-C CMOS (22.3x14.8mm)
Shutter speed	30sec-1/8000sec
Native ISO sensitivity	100-32,000 (51,200 expanded)
Drive speed	30fps electronic, 15fps mechanical
Max video resolution	4K (3840 x 2160)
Metering options	Evaluative, Partial, Spot, Centre-Weighted
AF zones	651 Dual Pixel CMOS AF II divisions
Max flash sync	1/250 sec (mechanical) 1/320 sec (electronic)
Connectivity	USB 3.2 Gen 2, Micro HDMI, Wi-Fi, bluetooth, microphone, headphone
Batteries	Rechargeable Li-ion (LP-E6NH)
Storage	2x SD/SDHC/SDXC UHS-II
LCD	2.95-inch, 1.62 million dot articulated touch-sensitive TFT LCD
Viewfinder	0.39-inch OLED colour EVF (2.36 Million dots)
Weight	530g (body only)
Dimensions	132 x 90.4 x 91.7mm

FEATURES

With high resolution, speedy AF and burst shooting, the R7 caters for most photographers

★★★★★

BUILD QUALITY

The R7 is built from magnesium alloy and high-strength engineering plastic

★★★★★

HANDLING

The deep grip makes the camera familiar to DSLR users and has a pro feel

★★★★★

QUALITY OF RESULTS

Detail is excellent, although dynamic range and high ISO performance could be better

★★★★½

VALUE FOR MONEY

With a pro-level spec, it has a competitive price and is a great entry point to the R-system

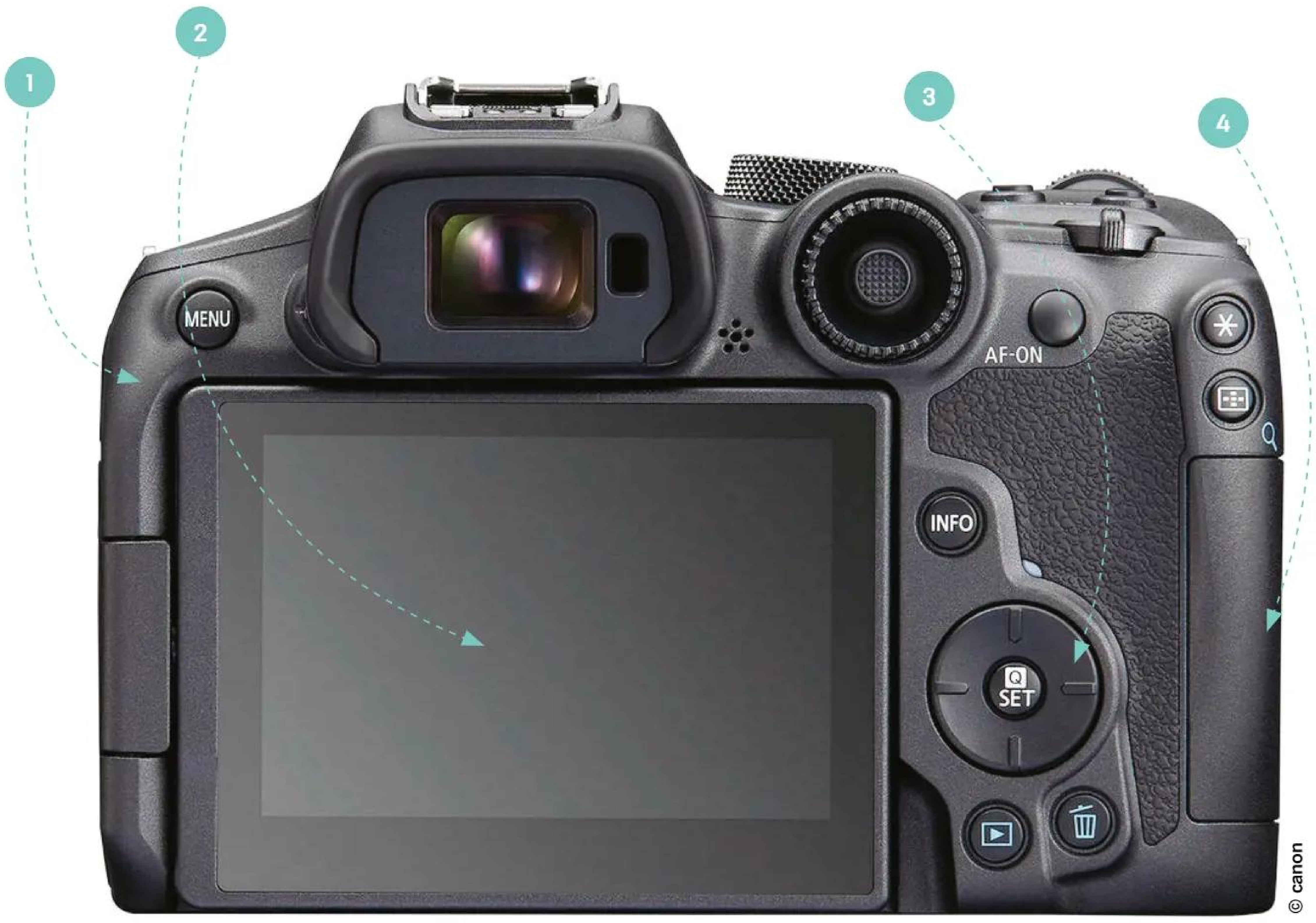
★★★★★

Overall

The Canon EOS R7 is the first camera you will reach for if you want the advantages of APS-C combined with pro-level speed, AF and resolution

★★★★★

> *"Quite simply, the EOS R7 is the new king of APS-C mirrorless cameras"*



© canon

① **Familar design**
Users of the EOS 7D series of DSLRs will feel at home with this new mirrorless model.

② **LCD screen**
There's an articulating 2.95inch 1.62m-dot monitor on the back of the EOS R7.

③ **Control layout**
There has been a control re-shuffle, so acclimation time will be required.

④ **Memory card slots**
The Canon provides dual SD card ports, but there is no CFexpress option.

ROLLER BAGS

Fed up with back-breaking backpacks? It's time to get your gear on a roll

We're somewhat spoilt for choice when it comes to carrying camera equipment, but most methods demand you shoulder the burden. So if you travel frequently or far, or simply need to carry some serious gear, put it on wheels and you won't look back.

A rolling camera bag is basically a rolling suitcase that contains customisable dividers tailored to support cameras and lenses. Not only are they more comfortable than a backpack, rolling bags also tend to be tougher.

You can certainly expect a rigid back, base and sides in your roller bag, and most designs also include exterior scuff protection in vulnerable areas. But if that's just not rugged enough for your needs, cosset your camera and lenses in a rolling plastic hard case and they'll be near-invincible.

With wheels taking the strain, it's tempting to buy the biggest bag you can afford. For maximum travel versatility, however, we've selected five designs for this Mini-Test that are just small enough to qualify as airline cabin luggage. However, size limits vary hugely across carriers, with budget airlines usually having the strictest rules, so make sure you check requirements with your airline before you show up at the airport.

Digital Camera
★★★★★
GREAT VALUE

www.calphoto.co.uk

1 Calumet RC1188 Rolling Camera Case

£169

This may be by far the cheapest option here, yet the RC1188 feels every bit as rugged as pricier rivals. You get reinforced outer corners, rigid sides, and plenty of scuff protection underneath – although all this toughness adds up to a 6.5kg unladen weight, making this the heaviest case on test. Its 25cm thickness could also be problematic at some check-in desks.

Inside, the padding and dividers are adequate, if not as impressive as the exterior quality. A 30cm internal width is about 3cm narrower than a case like the Manfrotto Reloader, yet that's enough to make it a tight squeeze to fit fast full-frame lenses alongside each other.

But Calumet claws back ground with extra features. The entire padded interior can be lifted out and has its own lid and carry handles. The practicality doesn't stop there: the front flap will expand by a whopping 19cm, effectively doubling the capacity of the bag.

VERDICT ★★★★½

Digital Camera
★★★★★
BEST ON TEST
Digital Camera
★★★★★
GOLD AWARD

www.manfrotto.co.uk

2 Manfrotto Pro Light Reloader-55

£310/$380

The Reloader-55's boxy design and 55 x 35 x 23cm dimensions fully use the carry-on size limits of most airlines. That gives it the most practical interior layout here, only rivalled by the Think Tank bag. You can also fit a 17in laptop and 10in tablet in slots on the outside of the front flap for easy access, and the underside of the flap contains plenty of pouches for filters and memory cards.

Compared to the feature-packed Calumet bag, the Reloader's extras are more subtle. One nice touch is an integrated zipper locking point on the side of the bag, which secures the main zippers more elegantly than a padlock.

This bag nails the basics though. Manfrotto's extra-thick dividers are sized to fit perfectly around full-frame kit while giving unmatched gear support and protection. Outside, the tough exterior is well-reinforced on key wear points, and includes user-replaceable wheels of a common size.

VERDICT ★★★★★

FIVE THINGS TO LOOK FOR…

1 **FLIGHT FRIENDLY** A bag measuring 55 x 35 x 23cm will see you through most airline check-ins – but many airlines won't allow more than 10kg in weight.

2 **DIVIDE AND CONQUER** Interior width is critical when packing larger lenses. Well-designed dividers can adapt to super-telephotos.

3 **BUILT TO LAST** Roller bags can take a lot of abuse. Wheels should be replaceable, while reinforced outer corners and undersides add longevity.

4 **THE COMPLETE PACKAGE** Look for bags that boast a laptop slot and a tripod attachment system. Easy-access outer pockets are a bonus.

5 **LITTLE EXTRAS** A roller bag with a pair of backpack straps helps with stairs or rough ground. Expandable compartments are also useful to have.

www.peliproducts.co.uk

3 Peli 1535 Air Case

£279/$221

Peli's entry is sized to fit within most carry-on limits, but should it need to go in the hold, this ultra-tough hard case will shrug off any abuse.

Hard cases are usually far from light, but Peli's Air range uses a clever honeycomb construction and light plastic to reduce weight without compromising toughness. The result is the 1535 Air weighs less than the Calumet and Tenba bags – including a full foam interior.

This is easily customised to suit your gear and offers great padding, though it's tricky to adapt to differing kit loads. Peli does offer a customisable divider set instead, albeit at extra cost.

Other drawbacks with the Air case compared with the other bags on test include a handle that extends around 10cm less, meaning the case is more prone to clipping your heel as you walk. The hard utilitarian design won't suit all occasions, though, and you can forget extras like laptop or tripod pockets.

VERDICT ★★★★☆

www.tenba.com

4 Tenba Roadie Universal

£265/$325

Tenba is keen to promote the construction and material quality of the Roadie, and it does indeed feel extremely rigid and robust. There are features like a weatherproof ballistic nylon exterior – reinforced in vulnerable areas – plus superb handles all round and user-replaceable wheels.

Size-wise, a 51cm height makes the Roadie a shade shorter than the Manfrotto and Think Tank bags, but helps ensure it can stay with you as cabin luggage. You'll still be able to carry a couple of bodies and up to eight lenses, with enough width to fit typical full-frame lenses three abreast. Ample interior padding offers good kit protection, if not quite up there with the Reloader-55.

Out on the front panel there's an easy-access slot for a 17in laptop, along with a well-designed tripod attachment system. Round the back, a rear pouch containing a steel security cable can tether the bag with an optional padlock.

VERDICT ★★★★½

www.thinktankphoto.com

5 Think Tank Airport TakeOff V2.0

£360/$370

Recognising that wheels aren't always the best mode of transport, Think Tank has come up with a roller bag and backpack in one. Simply open the rear pouch to reveal two backpack straps, and the pouch's padded flap folds down to offer lower back cushioning. This set-up is fairly comfy, although without a hip belt, you'll only want to wear the bag as a backpack when wheels won't do.

As one of the largest bags here, there's plenty of space inside for various kit configurations, while still staying within most airlines' carry-on limits. A decent set of dividers includes three with U-shaped cutouts to cradle cameras with attached lenses.

Premium fabrics and fittings help justify the price, but some corners have literally been cut. A lack of exterior corner reinforcement is surprising, and the overall toughness doesn't feel quite on a par with the Tenba Roadie, though the TakeOff is noticeably lighter at just 3.9kg.

VERDICT ★★★★☆

CSC www.canon.co.uk

Canon EOS R8

£1,699/$1,499

The Canon EOS R8 is a remarkably light and powerful full-frame camera, but has some ergonomic compromises. Gareth Bevan tries it out for size

The Canon EOS R8 reminds us just how far Canon has come since launching the original EOS R in 2018 – and just how many cameras, for all different types of consumers, the R system now encompasses.

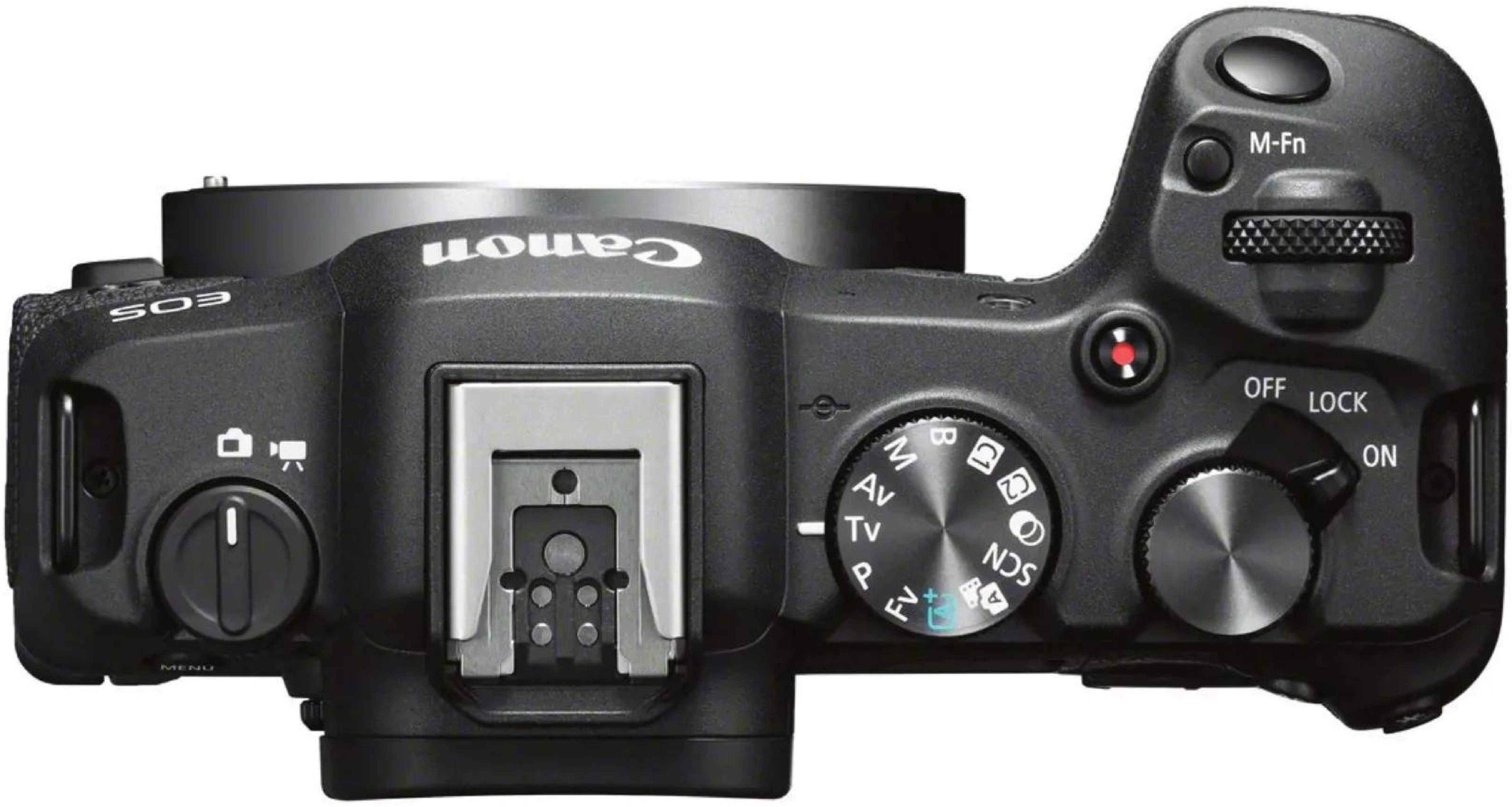
The R8, despite being one numerical value below the APS-C-equipped Canon EOS R7, actually sports a full-frame sensor. Canon says that the R8 sits between the Canon EOS RP, its entry-level full-frame camera, and the Canon EOS R6 Mark II for serious enthusiasts and professionals. And the EOS R8 is certainly something of a Frankenstein's monster out of the two, whether you see it as an upgraded RP or a down-specced R6 Mark II. In Canon's DSLR ecosystem, the full-frame range doesn't go any lower than the Canon EOS 6D Mark II. However, Canon is showing a keenness with its mirrorless range to hit every different type of camera at a much wider range of price points.

The EOS R8 uses the same 24.2MP sensor as the R6 Mark II, and also offers the same ISO range (which is expandable up to a whopping 102,400). The R8 can autofocus down to -6.5EV. That's thanks to the same Digic X processor as the R6 II. While 24.2MP might seem a little tame compared with some big numbers coming from other brands (or even smartphones), a 24.2MP full frame sensor will give you superb image quality for almost all common shooting scenarios, while being more manageable to organise and edit.

The pictures the EOS R8 produces are excellent. Images are sharp, with a good level of clarity, exhibiting Canon's popular colour science to provide JPEGs that are ready to share immediately. Or for those wanting a bit more space to play with their images, the RAW photos from this Canon sensor provide a fantastic level of dynamic range and colour to manipulate, I found I could regain a lot of detail in the shadows and highlights.

> "The body design is a close replica of the EOS RP, with a similar size and weight"

The R8 also shares the latest upgrades to Canon's autofocus and tracking system, with eye- and head-detection for humans, dogs, cats and birds, as well as tracking for horses and vehicles, including bikes, cars, trains and planes. The autofocus tracking in previous models has been nothing short of spectacular, with only a few stumbles on some animals that are more tricky to recognise. In practice, the EOS R8 autofocus is incredibly fast and accurate. Using the full sensor for focusing the R8 consistently picked up the correct subjects automatically without any prompts or input. Human recognition,



Opposite The R8 sits between the entry-level EOS RP, and the EOS R6 Mark II

Left There's no joystick, but Canon's reduced layout is still incredibly functional

Below Disappointingly, there is just a single SD card slot and a poor battery life

including faces and eyes, was no issue, with the camera nailing the focus each and every time.

When it came to animals, the results were a little more mixed, with the camera finding the shape of animals quite easily, but struggling on occasion to pinpoint their eyes or head, often choosing to focus on another area. Putting it through its paces on a range of more exotic animals at a zoo, the EOS R8 did exceptionally well in recognising a huge range of birds and cat/dog family animals. The autofocus even managed to pick up the eyes on some subjects that aren't strictly supported, such as monkeys and certain reptiles and amphibians, suggesting this might be the next frontier for Canon's ever-expanding number of recognised subjects.

When it comes to sheer speed, this is another thing that the EOS R8 has in common with its bigger sibling. It is able to shoot at 40 frames per second with the electronic shutter, and with the same DigicX processing power, the processing is quick. This is incredible for a camera of this size and price – speeds like that were once reserved for the best sports cameras, such as the Canon EOS 1D-X Mark III.

Regarding handling, the body is a close replica of the EOS RP, with a similar size and weight. While the omission of a joystick is unfortunate – with the recent entry-level EOS R10 having one, this feels more like obvious handicapping – Canon's reduced layout is still functional. With the touchscreen controls and latest autofocus system in the EOS R cameras being near flawless, this is easily worked around.

Features

RF mount

The EOS R8 features the standard Canon RF mount, allowing access to the full range of RF lenses and EF optics via an adaptor.

Full-frame Sensor

With the EOS R8, Canon fills a gap in its range, bridging the markets for the EOS RP and EOS R6 Mark II. This opens up enthusiast full-frame photography to photographers on a budget.

Digic X Processor

The EOS R8 shares a processing engine with the higher-end EOS R6 Mark II, allowing good dynamic range and a top ISO of 102,400, while keeping image noise to a minimum.

Electronic shutter

Another feature shared with the EOS R6 line is the rolling electronic shutter with up to 40 frames per second, making it one of Canon's fastest cameras. This is useful for capturing action shots and handheld HDR sequences.

Missing IBIS system

There is no in-body image stabilisation system in the EOS R8. However, it is the logical choice of a feature to omit and Canon's lens-based IS system is still capable for everyday shooting.

Video features

The R8 records up to 4K 60p (6K oversampled) or up to 180fps in FullHD, all using Canon C-Log3 or HDR PQ, and 4:2:2 10-bit recording.

RF MOUNT

Above Train tracking: Canon's autofocus system can also track vehicles, including bikes, cars, trains and planes

Left Swords drawn: The Canon sensor offers great dynamic range and colour detail in both shadows and highlights

Top right Clear images: The EOS R8's images are sharp and clear and feature Canon's colour science technology

Where this camera really falls down is with its single SD card slot – some similarly priced cameras from other brands include a second slot. The R8 is also heavily compromised by Canon's battery choice. The smaller and less powerful LP-E17 battery saves space, but battery life is disappointing, rated at just 220 shots using the viewfinder.

If you like the features of the EOS R6 Mark II, but your budget cannot stretch that far, then this is the camera to consider. There are compromises, but for online content creators, the R8 pretty much ticks all the boxes.

Understand the range

The EOS R series of cameras has naturally been compared and contrasted with Canon's line of DSLRs from the start, but the two ranges don't perfectly align. The EOS 6D Mark II was the lowest-end full-frame DSLR Canon provided, whereas the EOS RP and now the EOS R8 seem to straddle this equivalent position. In many ways, the R8 is an updated RP but Canon is choosing to keep the older camera in the range, offering some higher-end features in the EOS R8.

The RP shoots at a maximum of 4fps, while 40fps is available in the R8, for example. The R8 also features more diverse video options (the RP offers just 4K in 25p) a higher-resolution screen (1.62m dots over 1.04 million) and a more advanced AF system. This mirrors rival Sony's strategy of replacing an older camera and re-purposing it as a lower-end entry point to the range at a more affordable price. The EOS RP currently retails for £1,049/$999, the EOS R8 for £1,699/$1,499 and EOS R6 Mark II for £2,779/$2,499, making the R8 the camera for enthusiasts with slightly bigger budgets.

© Jon Devo x4

CANON EOS R8

Megapixels	24.2MP
Max resolution	6000 x 4000 pixels
Sensor information	Full-frame CMOS (35.9 x 23.9mm)
Shutter speed	30 – 1/16,000sec (electronic)
ISO sensitivity	100-102,400 (native), 50-204,800 (expanded)
Exposure modes	P, A, S, M, Bulb, C1/2, Auto+, Scene
Metering options	Evaluative, Spot, Partial, Centre-weighted
Flash modes	ETTL II Manual, Stroboscopic,
Connectivity	Wi-Fi, Bluetooth, USB 3.2 Gen 2, HDMI (Type D), Remote, Mic, Headphone
Batteries	Rechargeable Li-ion (LP-E17)
Storage	1x SD/SDHC/SDXC UHS-II
LCD	3-inch 1.62 million dot Clear View LCD II vari-angle touchscreen
Viewfinder	0.39 inch OLED colour EVF (2.36 million dots)
Weight	414g approx (body only)
Dimensions	132.5 × 86.1 × 70.0mm

FEATURES

With a wide range of tools, the R8 will keep both stills and video shooters happy across many genres

★★★★½

BUILD QUALITY

There's no weather-sealing but the build is what you would expect at this price

★★★★☆

HANDLING

The lack of joystick and SD slot placement are both unfortunate

★★★★☆

QUALITY OF RESULTS

Images and video are fantastic, offering pro-grade quality for an entry-level budget

★★★★★

VALUE FOR MONEY

If you can spend a little more, the R8 is a more up-to-date option than the older EOS RP model

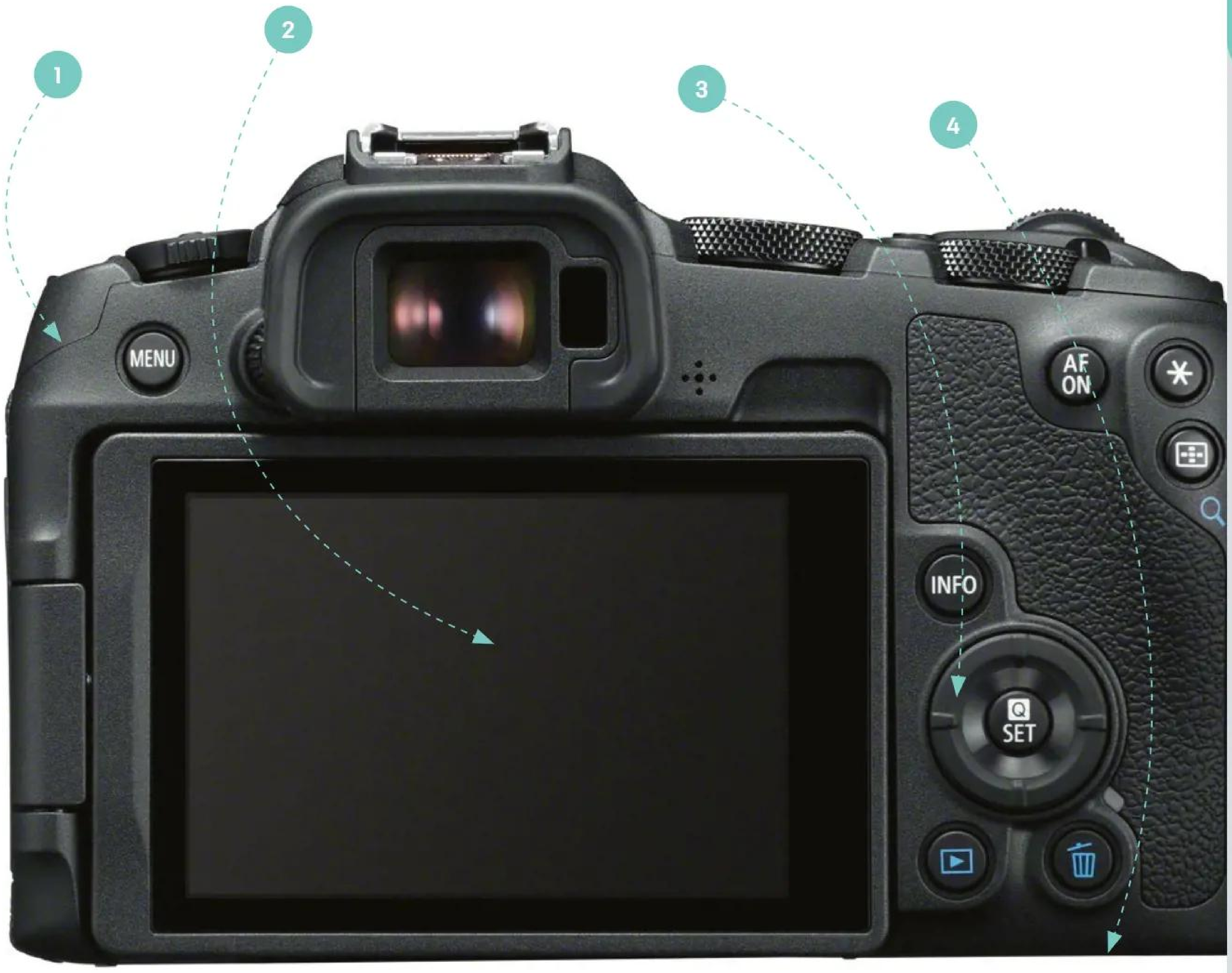
★★★★★

Overall

Whatever your photographic medium, the EOS R8 can shoot it. It doesn't scrimp on the technology, but has some ergonomic compromises

★★★★½

> *"The sheer speed of the Canon EOS R8 is another thing that it has in common with its bigger sibling, the EOS R6 Mark II"*



① **RP similarities**
The body is almost identical to the EOS RP but with some size and weight advantages.

② **Rear LCD**
Compared with the EOS RP, this screen has a higher resolution of 1.62m dots.

③ **Control layout**
It's a shame the joystick has gone missing, but the touchscreen helps mitigate the loss.

④ **Memory card placement**
Frustratingly, the single SD card slot is located in the battery compartment.

Canon
EOS
R6
Mark II
CANON LENS RF24-105mm F4 L IS USM
φ77mm

EOS
Canon
AF-ON
OFF LOCK ON
M-Fn
SCN

Canon
EOS
R6
Mark II

CSC www.canon.co.uk

Canon EOS R6 Mark II

£2,779/$2,499 (body only)

This 40fps speed demon makes mincmeat of other hybrids - James Artaius and Gareth Bevan take the Canon EOS R6 Mark II for a spin

If the Canon EOS R6 Mark II were an animal, it would pack teeth like switchblades, razor-sharp talons and the footspeed to chase down anything foolish enough to draw its attention. While the Canon EOS R6 Mark II is almost a top-to-bottom specs improvement over the original Canon EOS R6, it also manages to outpace even the mighty Canon EOS R3 – boasting an amazing 40fps continuous shooting speed. This actually outguns both the Sony A1 and Nikon Z9, too, if you count the Z9 cheating by shooting 11MP images at 120fps.

Key features

The Canon EOS R6 Mark II is about more than just sheer speed. From its full-width, 6K-oversampled video to the brand new 24.2MP sensor, to the ability to pre-record both stills and video so you don't miss a microsecond of the action, this is the most fully loaded mid-range camera available on the market.

Chief among the upgrades is resolution, with a new image sensor boasting 24.2MP (compared to the 20.1MP of the original). Already overkill for use on the web and social media, with 24.2MP, you can comfortably print travel or wedding photos for home display. This is the sweet spot for resolution right now for almost everybody, with few photographers needing a higher resolution for their work.

And what photos it produces! With the R6 Mark II, Canon continues its long pedigree in incredible stills photography. The images coming out of the R6 Mark II are glorious – sharp and detailed, with punchy colours and rich contrast. Canon's JPEGs have always been some of the best around for use straight out of the camera and, unsurprisingly, the R6 continues this tradition. The R6 performed admirably in low light with plenty of usable images at high ISOs. Without pixel peeping, grain didn't really start to become distracting until above ISO12800.

New to the EOS R6 Mark II are HDR images with moving subjects. This is quite the feat considering an HDR image is comprised of three separate images that have been merged. Canon hasn't explained how this works, but its new burst mode might play a part. The HEIF images you get from using Canon's HDR shooting modes are great, though you can get pretty much the same results from tweaking a RAW file. However, HEIF images are less effort and avoid the huge sizes and incompatibility of RAW files. The RAWs from the R6 Mark II are excellent, the dynamic range has improved, allowing you to recover more detail in the shadows and highlights. The sensor is not stacked or BSI (back side illuminated) so you can get better results from other cameras, but it's a step forward for Canon.

For video, everything has been improved, and the Mark II feels like the camera to get if you are a hybrid content creator. What you do get is full-width 4K UHD recording at up to 60fps, or Full HD recording at up to 180fps, which gives you the freedom for some slow motion. All these video modes can record internally in 4:2:2 10-bit, Canon Log 3, and HDR PQ, so you can have maximum control over the final look of your video.

The video straight from the camera in 4K is incredible. The detail and sharpness are fantastic and the processor does an amazing job of managing colours, brightness and HDR directly in the camera. You could easily shoot footage on the R6 Mark II that you would be happy to use with no post-production.

Build and handling

The R6 Mark II feels sturdy in the hand, and the grip is deep and, for lack of a better word, grippy. This meant I could confidently hold the camera with the reasonably heavy RF 24-70mm f/2.8L attached with just one hand. The design feels both familiar and safe – in fact, it is almost a classic Canon build.

Features

RF mount

Canon's EOS R6 Mark II features the standard Canon RF mount, allowing access to every full frame RF lens and the new APS-C RF-S optics.

24.2 MP sensor

There has only been a modest increase in pixel count from the original EOS R6, but the new sensor still offers enough resolution for most online and editorial applications.

5-AXIS, 8-STOP IBIS

The EOS R6 Mark II features Canon's now signature In-Body Image Stabilisation system, which allows handheld stills and video at exposures of up to 8-stops longer.

VIDEO FEATURES

Full-width 4K UHD is available at up to 60fps, with Full HD up to 180fps also on offer. While these are recorded internally, 6K 60p ProRes RAW is possible using an HDMI connection.

Dual Pixel II AF

The Canon-branded Dual Pixel II autofocus system continues to impress, with new intelligent recognition modes having been added for the Mark II model.

Creative features

The rapid 40fps burst mode also opens up new features, such as RAW pre-burst mode and in-camera focus bracketing.

EOS
R6
Mark
RF MOUNT

© James Artaius

CALEDONIAN ROAD
© Gareth Bevan

Above Dynamic range: Better dynamic range in RAW files means you can recover more detail in shadows and highlights

Left Rich contrast: The images are sharp and detailed, with punchy colours and a rich contrast

Opposite Fast action: New features, such as the RAW pre-burst mode, mean you won't miss a moment of the action

After some past design quirks, it is pleasing to see that Canon has stuck with the trio of control wheels it used with much success on the original R6. But to borrow a phrase from another Japanese export, the R6 Mark II doesn't spark a sense of joy when I hold it. There is something that just doesn't give me the same feeling as cameras from other brands.

Performance

We have praised Canon's Dual Pixel II autofocus before, but it bears repeating, the autofocus on the Canon R6 Mark II is out-of-this-world good. However, Canon has made the confusing decision not to allow you to turn continuous autofocus off on the Mark II.

The buffering speed is the only thing that holds this camera back, and I ran up against the wall a couple of times when shooting at 40fps with a buffer of only 75 RAW images.

Canon has flipped the script with the EOS R6 Mark II and there is almost nothing that it can't do. This hybrid camera packs an obscene amount of firepower for both resolution and speed. Like the best hybrid cameras, this is a body designed with an equal focus on both photography and videography, and switching between the two mediums has seldom been easier. The Canon EOS R6 Mark II is Canon's finest 6-series camera yet and a brilliant sibling to the Canon EOS R5 for those who don't need ultimate resolution but still want premium performance.

Blistering frame rate

The blistering 40fps electronic shutter is crazy for a camera in this price range, and it doubles the speed of the original R6 and even puts it up against the Canon R3.

One of the major worries with a fast electronic shutter is the rolling shutter, and while we didn't get a chance to really put this through its paces, we are pleased to say that in photographing fast-moving birds, we didn't notice this as an issue at all.

Another new feature of Canon's EOS R6 Mark II is the RAW pre-burst mode. Using the 40fps burst mode, the camera starts taking images 0.5 seconds before you fully press the shutter. As someone who is not a professional sports or wildlife photographer, this might not suit everyone (we would tend to start shooting slightly ahead anyway to capture the moment), however, for those people who cannot miss the absolute perfect frame, this might be essential. When using the mechanical shutter (12fps) of the Canon EOS R6 Mark II, we never troubled the buffer limit once.

© Gareth Bevan

© Canon

© James Artaius

CANON EOS R6 MARK II

Megapixels (effective)	24.2MP
Max resolution	6000x 4000 pixels
Sensor information	Full-frame CMOS (36X24mm)
Shutter speed	1/16,000 – 30s **(electronic)**
ISO sensitivity	100-102400 (native), 50-204,801 (expanded)
Exposure modes	P,A,S, M, Auto, Bulb, Scene, Fv, Creative, **Custom**
Metering options	Evaluative, Partial, Spot, Centre weighted
Flash modes	E-TTL II, Auto, Metered Manual, Off
Connectivity	Wi-Fi, USB 3.2, USB C, HDMI micro (Type D), E3 remote, Mic, Headphone
Batteries	Rechargeable Li-ion (LP-E6N/H)
Storage	SD/SDHC/SDXC (UHS-II)
LCD	3" 1.62 million dot articulated Clear View II LCD touchscreen
Viewfinder	0.5-inch OLED colour EVF (3.69 Million dots) 100% FOV, 0.76x mag
Weight	588g approx (body only)
Dimensions	138.4 × 98.4 × 88.4mm

FEATURES

A huge range of pro tools are on offer for both video and stills shooters. There is plenty to play with here

★★★★★

BUILD QUALITY

While polycarbonate is used over metal in places, it feels robust enough for professional use

★★★★☆

HANDLING

The Canon R6 Mark II might not have the most inspiring or exciting design but it is reassuringly Canon

★★★★☆

QUALITY OF RESULTS

The image quality of stills as well as movies is superb, with excellent detail and dynamic range

★★★★½

VALUE FOR MONEY

With all of the aforementioned features, you get a lot of camera for your money

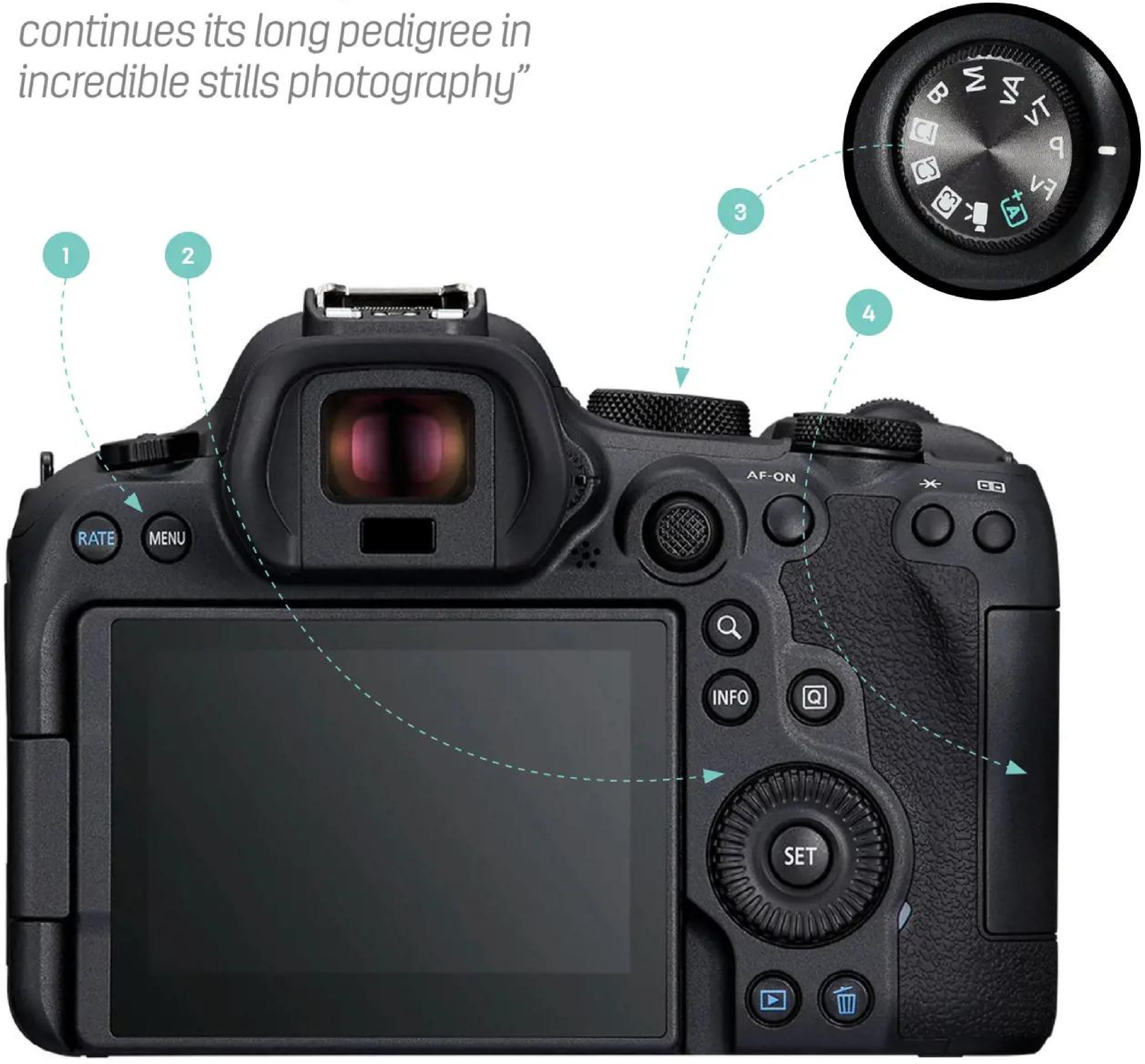
★★★★½

Overall

An upgrade in nearly every department makes this camera arguably the best you can buy in this price range right now. It is even nipping at the heels of its big brother, the Canon EOS R5.

★★★★½

> *"With the R6 Mark II, Canon continues its long pedigree in incredible stills photography"*



① **POLYCARBONATE BODY**
Plastic is used to keep weight down but it still feels sturdy and professional

② **DUAL SD CARD SLOTS**
Two slots are on offer, but no CFexpress compatibility is provided on the R6 Mark II

③ **NO TOP-PLATE LCD**
As with the original, the R6 Mark II dispenses with the top info screen seen on the EOS R5

④ **FAMILIAR LAYOUT**
The design is unmistakably Canon, which long-time system users will definitely appreciate

CSC www.canon.co.uk

Canon EOS R5

£4,199/$3,899

A combination of incredible stills with fantastic – if frustrated – video

SPECIFICATIONS

Sensor _45MP full-frame CMOS 36 x 24mm
Image processor _ Digic X
AF points _5,940 Dual Pixel CMOS AF II
ISO range _100-51,200 (expandable to 50-102,400)
Stabilisation _ Five-axis, up to eight stops
Max image size _ 8,192 x 5,464px
Metering zones _384
Video _ 8K DCI or UHD at 30p, 24p / 4K DCI or UHD at 120p, 100p, 60p, 50p, 30p, 25p, 24p / 1080p (Full HD) at 60p, 50p, 30p, 25p, 24p
Viewfinder _ 0.5-inch OLED EVF, 5,690k dots, 100% coverage, 0.76x magnification, 120fps refresh rate
Memory card _ CFexpress type B, UHS-II SD/SDHC/SDXC
LCD _3.15-inch fully articulating touchscreen, 2,100k dots
Max burst _12fps mechanical shutter, 20fps electronic shutter
Connectivity _Wi-Fi 5GHz and 2.4GHz, Bluetooth 4.2, USB-C (USB 3.1 Gen 2), micro HDMI (type D), microphone, headphone, N3 remote, flash sync, Ethernet (via WFT-R10 grip)
Size _ 136 x 98 x 88mm
Weight _ 650g body only (738g with card and battery)

The Canon EOS R5 arrived after months of waiting and masterful teases by the – there's no other word for it – canny manufacturer.

No camera in recent memory had received or deserved this amount of hype. The Canon EOS R5 is a powerhouse performer: its 8K video outclasses many cinema cameras; its shooting speed puts it on par with the best sport cameras; its 45MP sensor outmuscles all but a few of the best mirrorless cameras; and its eight-stop in-body image stabilisation is the new IBIS champion.

Of course, something had to be too good to be true. No sooner had the camera been revealed than the realities hit home regarding its headline video capabilities. Ironically, those red-hot specs are literally too hot for the camera to handle, as the R5 is subject to recording limitations to prevent it overheating.

① The R5's chassis is near-identical to the EOS R, but it's slightly thicker and 70g heavier, in order to accommodate the new IBIS system.

② Canon claims that the EOS R5's 45MP image sensor is the highest resolving of any EOS camera – including the 50.6MP 5DS R.

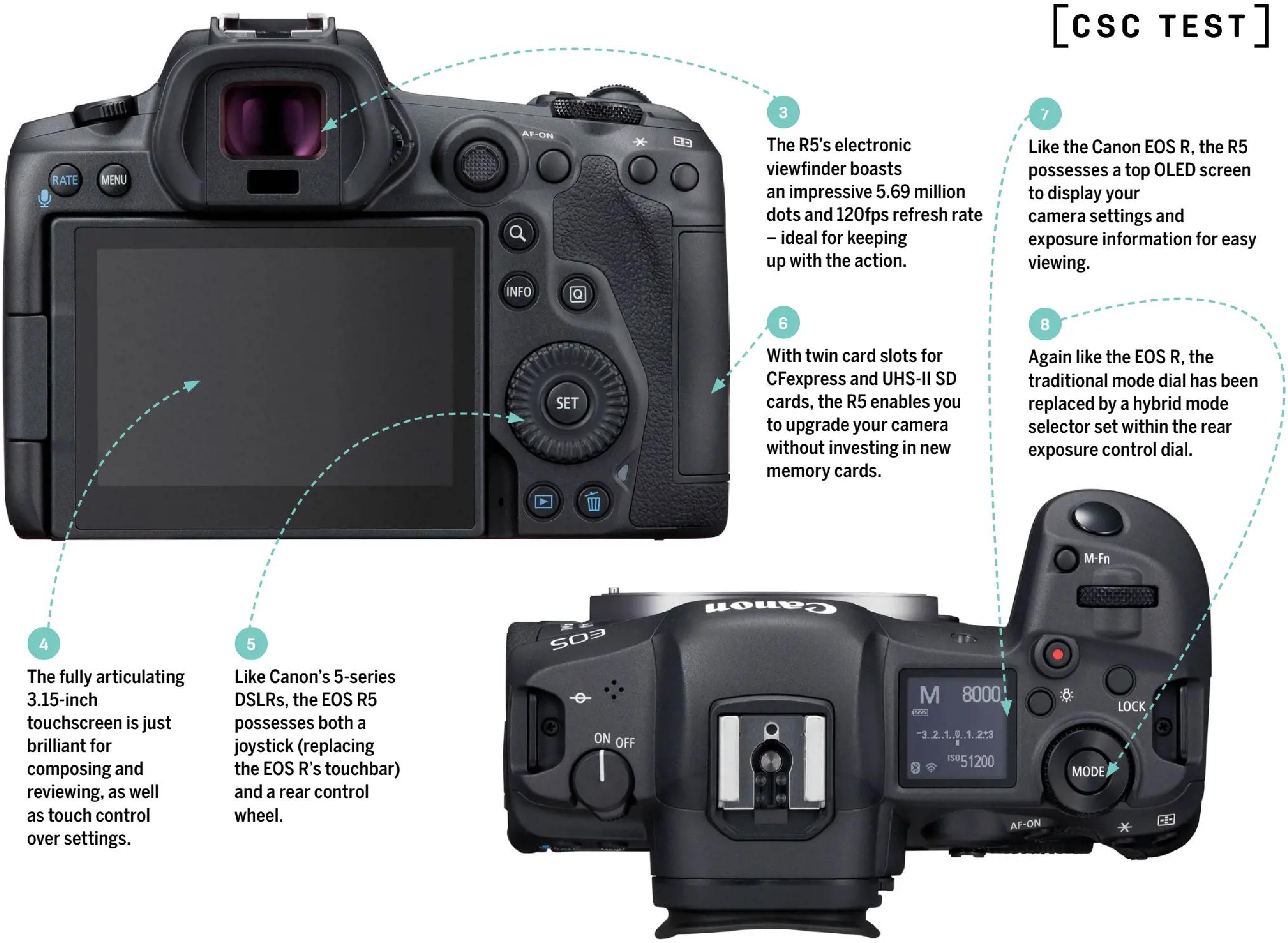
Features

Obviously the headline attraction here is the R5's remarkable video capability. It can capture full-width (uncropped) raw 8K video using the entire readout of the 35mm sensor – and it does so internally at up to 29.97fps in 4:2:2 12-bit Canon Log or HDR PQ (both H.265) in both UHD and DCI.

Its 4K capture is every bit as ferocious, recording at up to 119.88fps (in the same 4:2:2 Canon Log or HDR PQ, in UHD or DCI), with external HDMI recording up at up to 59.94fps. However, the R5 is much more than just a video behemoth.

Since the 8K DCI video has a resolution of 8,192 x 4,320, the camera has a Frame Grab function that enables you to take high-resolution 35.4MP stills (as either JPEGs or HEIF files) from your footage – which is 5.1MP greater resolution than the Canon EOS R.

All of this is thanks to the brand-new 45MP image sensor – supposedly resolving even greater detail than the 50.6MP Canon EOS 5DS. This is thanks to the new



3
The R5's electronic viewfinder boasts an impressive 5.69 million dots and 120fps refresh rate – ideal for keeping up with the action.

7
Like the Canon EOS R, the R5 possesses a top OLED screen to display your camera settings and exposure information for easy viewing.

6
With twin card slots for CFexpress and UHS-II SD cards, the R5 enables you to upgrade your camera without investing in new memory cards.

8
Again like the EOS R, the traditional mode dial has been replaced by a hybrid mode selector set within the rear exposure control dial.

4
The fully articulating 3.15-inch touchscreen is just brilliant for composing and reviewing, as well as touch control over settings.

5
Like Canon's 5-series DSLRs, the EOS R5 possesses both a joystick (replacing the EOS R's touchbar) and a rear control wheel.

low-pass filter design, which was introduced in the flagship Canon EOS-1D X Mark III. Traditional low-pass filters (employed to get rid of moiré) employ dual-layer, four-point subsampling and introduce a layer of softness to images. Canon's new tech features quad-layer, 16-point subsampling and combines it with a Gaussian distribution technique to deliver sharpness rivaling the 5DS.

The flagship 1D X Mark III has served as donor for much of the tech in the R5. The AI-powered Deep Learning AF system has been transplanted, enabling the new camera to perform spookily accurate eye, face and head tracking. However, the R5 has a trick that even the Mark III doesn't have: it is also capable of Animal AF that can track the eyes, faces and bodies of dogs, cats and birds. Underpinning the autofocus is the brand-new Dual Pixel CMOS AF II, the latest generation of Canon's much-lauded AF system.

Best of all, all of these autofocus technologies are available in stills as well as all video resolutions and frame-rates – with a staggering 5,940 AF points for photography and 4,500 for filming.

The continuous shooting speed is also on par with the 1D X Mark III, as the R5 matches the flagship's top speed of 20fps via the electronic shutter (and 12fps using the mechanical shutter). Backed up by dual card slots, including lightning-fast CFexpress support, this means that the R5 can stand toe-to-toe with sports cameras, video cameras and medium-format cameras alike.

Most excitingly, for long-suffering Canon users, the EOS R5 features the company's agonisingly overdue implementation of five-axis in-body stabilisation. The wait has been worth it, however: Canon is now officially the king of IBIS – the R5 (along with the Canon EOS R6) boasts up to eight stops of CIPA-rated stabilisation, depending on the lens.

While you get the top stability when you use specific RF-mount glass, the IBIS also works with >

Meet the rivals…

The cameras taking on the Canon R5…

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Canon EOS 5D Mk IV
£2,789/$2,499
Its DSLR sibling fares better in terms of ISO and dynamic range, but the R5 is a far superior camera overall.

★★★★★

Nikon Z 7
£2,499/$2,799
The Z 7 resolves finer detail and also boasts better dynamic range, but video features and AF are nowhere close.

★★★★★

Sony Alpha 7R IV
£3,499/$3,199
Its 61.2MP sensor is the winner in terms of pure resolution, but for speed, IBIS, AF and video, the R5 is king.

★★★★☆

EF lenses and EF-S lenses, as well as 'dumb' lenses with no electrical contacts – that means vintage lenses, cinema lenses, lenses adapted from other camera systems… essentially any lens.

Build and handling

In the hand, the EOS R5 feels like a slightly beefier EOS R. It's almost imperceptibly thicker (by 4mm), but it has notably more heft, weighing about 70g more. The weight is very evenly distributed, though, and the body feels well-balanced – indeed, the extra mass makes it feel a better match for some of the notoriously larger RF lenses.

From the top, the R5 is very similar to the EOS R and bears the same top OLED screen and mode button within the rear control dial. It's the rear where the differences start to come into play. The first thing you'll notice is that the love-it-or-loathe it M-Fn touchbar has been abolished; in its place is a familiar joystick, with the AF-On button assuming its more traditional position.

"You can safely tell your Sony-owning friends that Canon now has the best autofocus in town"

A control wheel has also replaced the individual D-pad buttons seen on the EOS R and the EOS RP, all of which makes the R5 feel much more like using a Canon EOS 5D Mark IV.

The camera retains the articulating touchscreen seen on the EOS R and RP, which is obviously important for recording video (as well as taking stills from elevated or low angles).

Being a 5-series camera, you can expect the robust weather sealing – although invariably, given that the mirrorless model is daintier (and also features an articulating screen), it doesn't feel as sturdy as the 5D. It will withstand some knocks, but unlike the DSLR you really wouldn't want to drop it or leave it in the hands of children.

Performance

OK, let's deal with the thing everyone's talking about right away: yes, shooting anything above standard 4K 30p video will cause the Canon EOS R5 to heat up internally, thus requiring recording limits to prevent overheating. Shooting 4K 30p causes no overheating issues, though, so you can shoot as much video as you like. (All recordings are subject to the usual 30-minute limit per single file, but you can record multiple 30-minute files.) However, limitations will be incurred as your video settings become more demanding. Shooting 4K 60p will cause the camera to overheat in about 35 minutes, while shooting 8K 30p will result in overheating in about 20 minutes – after which you need to allow the camera to cool down before recording again.

If you regularly shoot video above 4K 30p, this is definitely an issue. While it's unusual for any production to shoot single 20-minute takes, the overheating issue is cumulative – so if you shoot a series of shorter videos, or if you shoot a lot of stills, the camera innards will already start to heat up, making it very difficult to gauge how much time you can actually record for.

Again, none of this applies to 4K 30p – and we happily spent days on end shooting both 8K 30p and 4K 60p clips in-between stills without a single issue. However, if your interest is video first and stills second, we don't think the R5 will be fit for purpose – and we strongly recommend taking it for a test drive to make your own decision.

If you don't fall foul of the recording limitations, though, you will behold 8K video that is astoundingly rich and detailed, and

Above Between its phenomenal AF, the great image quality and the brilliant 35.4MP frame grabs from 8K video, the Canon EOS R5 is the best camera on the market for shooting wildlife

Opposite page The massive 45MP resolution of the Canon EOS R5's image sensor captures your subjects in stunning levels of detail, whether you're shooting stills, 4K or 8K video

the oversampled 4K modes produce some of the best footage we've ever seen. The standard 4K modes feel quite pedestrian, however, and early word is that regular 4K is actually superior on the Canon EOS R6.

Are there any other stings in the tail, though? In short, no – everything else behaves exactly as we all hoped and expected it would. The 45MP photographs are stunning, with crisp detail that may or may not match the 5DS in pure lab tests, but taken side by side they certainly pass the eyeball test and look every bit as good.

Almost as impressive are the 35MP Frame Grabs you can extract from 8K video. This is technology that has been in other cameras before, but never with the level of detail and fidelity seen here. Simply scrub through your 8K footage on the back of the camera, pinpoint the frame you want as a still, and push a button to produce a 35MP image – and it isn't the kind of blurry, low-res still you get when you screenshot a YouTube video; it's a pristine high-resolution file that looks like it was taken as a photograph on a camera with a decent 35MP sensor.

Of course, being that it is a JPEG taken from a video, you get virtually zero dynamic range to play with – the video exposure is baked in, so you can't recover anything from blown-out highlights (although there is still data to recover in the shadows). Still, provided that your lighting is right in the first place, yes – you can literally now film your photoshoot as a video, and simply pull the still frames you want from it afterwards. Cheating or not, it works and it's brilliant.

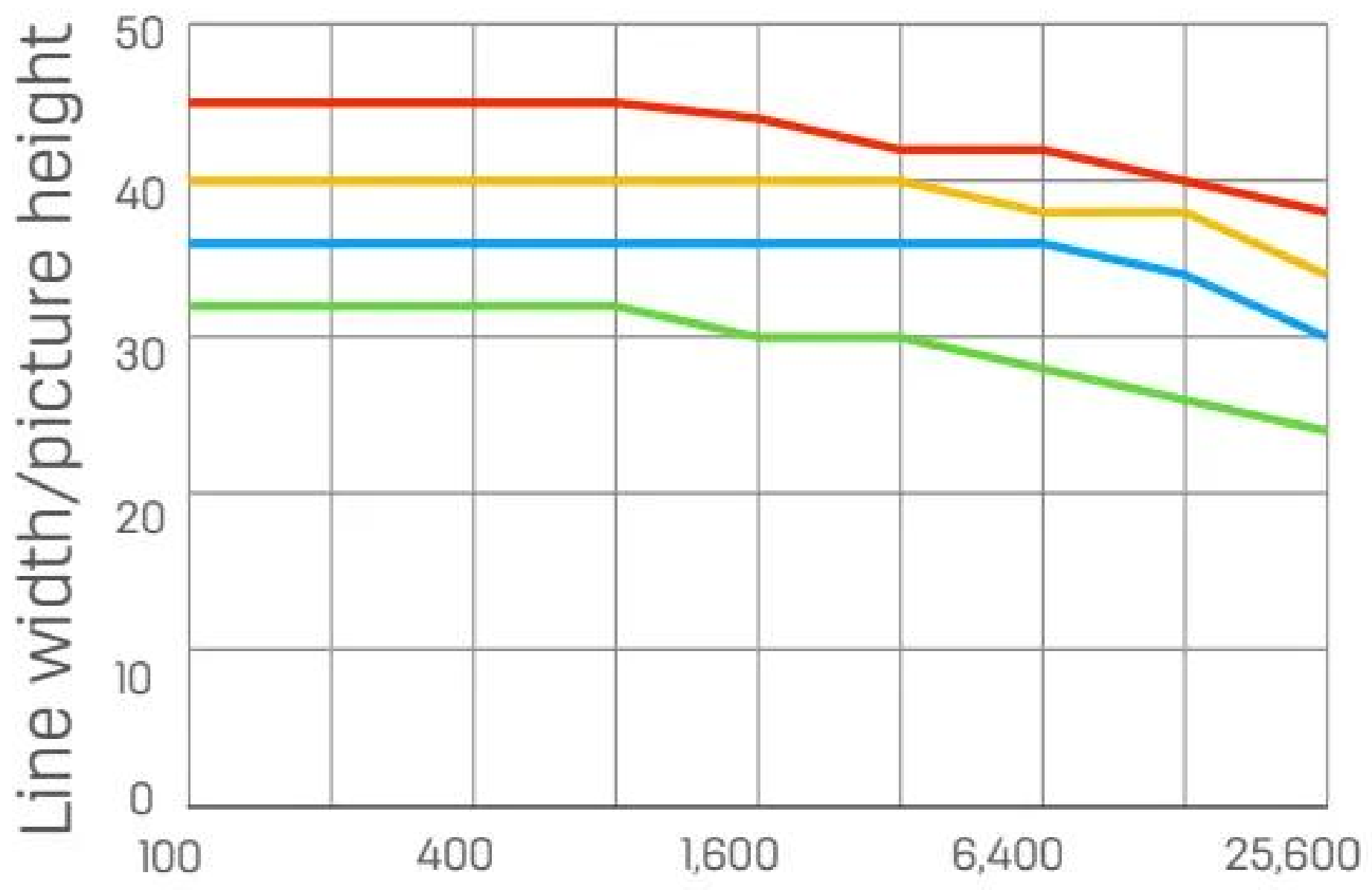
Speaking of cheating, that's what the new Animal AF is: a cheat code for wildlife photography. Canon's new Deep Learning algorithm is so good that all you have to do is point your camera at an animal, and the R5 will recognise, track it and even focus on the eyes. Canon only certifies it for dogs, cats and birds, but we successfully tested it on lions, monkeys, turtles, iguanas, fish, meerkats… if it's got eyes and a face, the R5 should recognise it.

The AF is even better when it comes to shooting human subjects, with a witchcraft-like ability to find and focus on faces and eyes in an instant – even when features are obscured or your tracking gets interrupted by hands, objects or passers-by. You can safely tell your Sony-owning friends that Canon now has the best autofocus in town – it really is black magic.

Best of all, these autofocus functions are all 100% available and effective when you shoot video. So whether you're filming videos of the bride and groom at a wedding, or footage of wild animals chasing each other across the Serengeti, the EOS R5 will find your subjects and focus on them. The AF is spookily good – it's just a shame that the R5 is haunted by the spectre of its video.

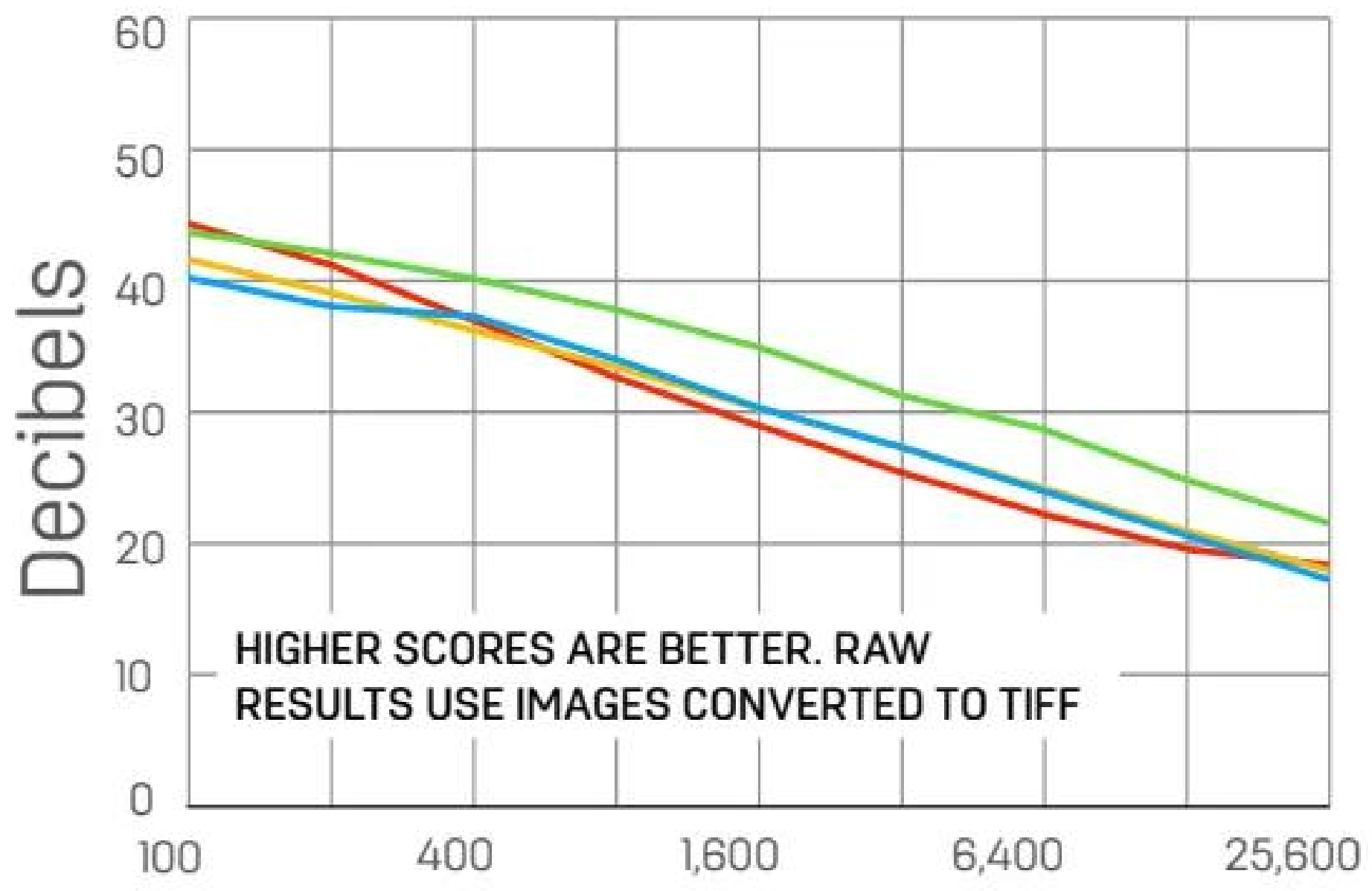
🟦 Canon EOS R5
🟨 Nikon Z 7
🟩 Canon EOS 5D Mk IV
🟥 Sony Alpha 7R IV

RESOLUTION



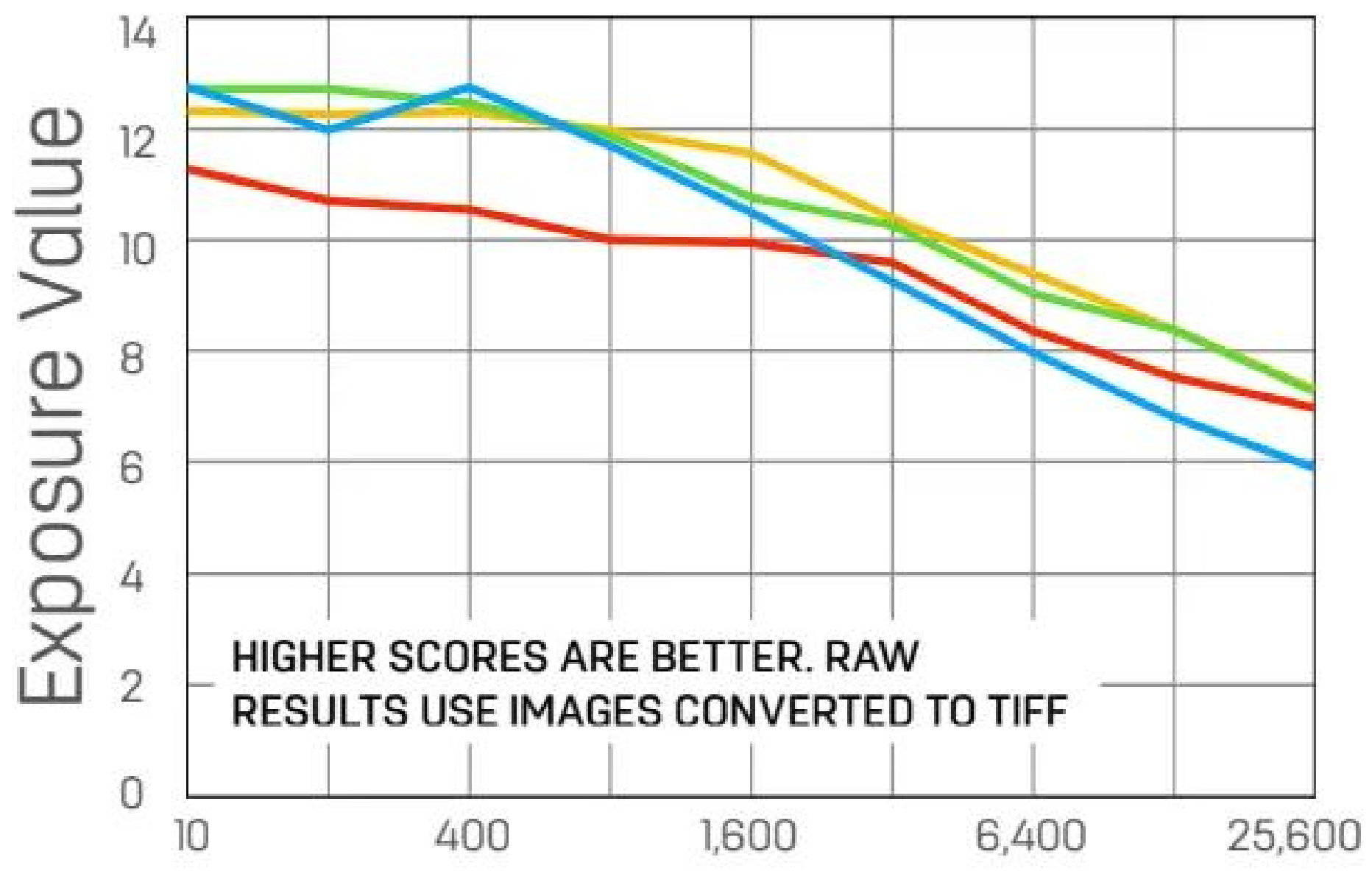
The R5's real-world images are comparably sharp to those from the Z 7. With 30.4MP, the 5D Mark IV can't compete with its mirrorless counterparts for fine detail capture.

RAW SIGNAL-TO-NOISE RATIO



The R5 scores well alongside the Z 7 and A7R IV. However, the 5D Mark IV generates cleaner images than the newer mirrorless cameras at most settings.

RAW DYNAMIC RANGE



At lower sensitivities, the R5 is capable of capturing similarly high dynamic range to the 5D IV DSLR and the Z 7. However, at higher sensitivities the it can't stay at the top.

WE SAY…

The R5's video is incredible – but its overheating restrictions are a major flaw. However, as a stills camera, the R5 is Canon's best product ever. It's the perfect amalgamation of the EOS R's form, the EOS 5D IV's function, and the autofocus of the EOS-1D X.

VERDICT

FEATURES	★★★★★
BUILD & HANDLING	★★★★★
PERFORMANCE	★★★★☆
VALUE	★★★★☆
OVERALL	★★★★☆

Help me buy an... SD card

Almost all digital cameras use this one memory card type, so why are there so many variations? We cut through the jargon to explain all

Rocket science and brain surgery are reckoned to be the two most complex disciplines imaginable – but we'd like to add choosing an SD memory card to that list. In principle, it should be quite simple. They're all the same size, so it's just a case of working out how much capacity you need and how much you want to pay, right?

Not exactly – because as anyone who's ever gone shopping for an SD card will know, there is an incredibly confusing choice of speeds, capacities, class ratings and standards to navigate. The best card for stills photography may not be the best for video, and you could easily end up spending too much money on a card with higher performance than you need.

So here's our simple guide to making sense of all the SD card types currently on sale, their pros and cons and their associated jargon.

1 SD vs SDHC vs SDXC

The original SD Card format was a pretty feeble thing, with a maximum capacity of just 2GB and transfer speeds that were tolerable for the cameras of the time, but no good for today's models. SDHC (High-Capacity) cards are now the basic norm, offering capacities up to 32GB and enough speed for Full HD video (depending on their Class rating). If you want higher capacities and 4K video recording, you need an SDXC (eXtended-Capacity) card.

2 SD and microSD

There are three sizes of SD card, but only two in common use. Regular cameras use the standard SD Card size. There is a miniSD format, but in practice the only other common size is the microSD format, used in action cams and 360 cameras.

3 Capacity

If you shoot JPEGs, practically any card will do: it's quite hard to find cards smaller than 8GB these days. If you prefer to shoot raw files, 32GB is a sensible minimum.

4 Maximum speed

Memory card makers traditionally quote their card's maximum data transfer speed. It's a reasonable guide to the card's speed for stills photographers, though read and write speeds are different and makers often quote the faster 'read' speeds. Maximum speeds may be quoted in MBps or as an 'x' number based on the old CD-ROM speed of 150KBps. 50MBps is tolerable; 300MBps is very good.

5 Video class ratings

Maximum speed doesn't tell the whole story. If you shoot video, it's the minimum sustained speed that counts. Slower cards have Class ratings – Class 2 is feeble and only good for standard-definition video; Class 4 is OK for standard (720p) HD video; and for Full HD you'll need Class 6 or Class 10. Class 10 cards overlap with the newer UHS Class I (U1) rating, but there's a higher UHS Class 3 (U3) rating for 4K video. For 4K, this is being superseded by new V30, V60 and V90 standards.

6 UHS-I and UHS-II

UHS-I cards look like regular SD cards, but offer higher transfer speeds (50-140MBps), while UHS-II cards have a second row of contacts on the back and offer much higher transfer speeds (156-312MBps). This is more important for videographers than stills photographers.

7 Compatibility

Unless the maker has provided a firmware update, you may find your elderly DSLR can only use the old SD cards available at the time and not newer SDHC or SDXC types.

Good, better, best

Three SD cards at different prices

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PNY
HIGH PERFORMANCE
32GB
7x HD Video
50MB/s

PNY Performance Class 10 SDHC 32 GB
£14/$14
PNY is just one of many affordable memory card brands. This 32GB Class 10 SDHC card and others like it are an affordable everyday buy that gives good capacity and transfer speeds for stills and Full HD video.

SanDisk
Extreme
90MB/s
V30
64GB
SanDisk

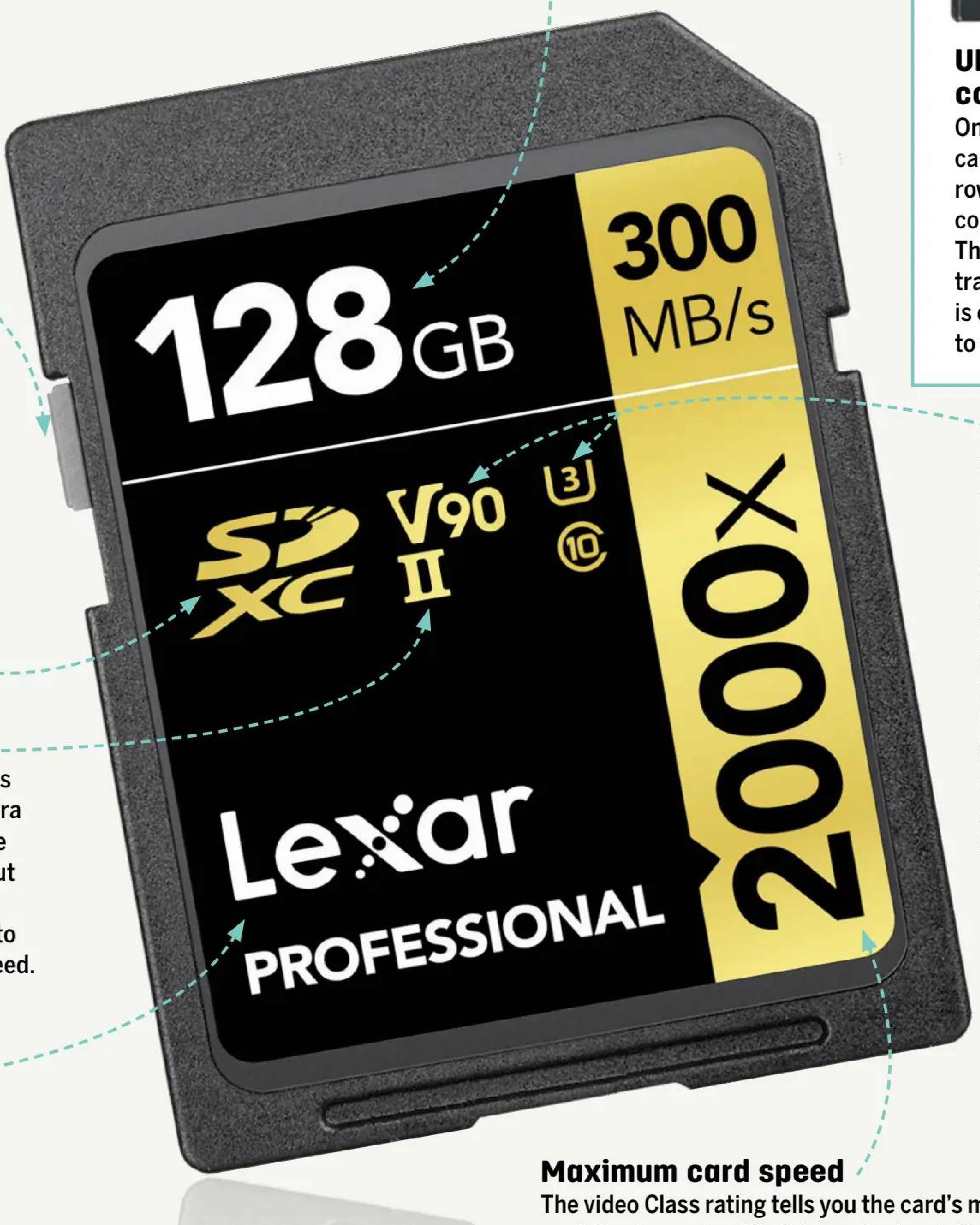
SanDisk Extreme 90MB/Sec 64GB SDXC Card
£35/$23
You don't have to buy a UHS-II memory card to get good performance. Mid-range UHS-I cards like the SanDisk Extreme range blend capacity, value and a U3 rating for 4K video.

128GB
300 MB/s
V90
Lexar PROFESSIONAL
2000x

Lexar® Professional 2000x DHC™/ SDXC™ UHS-II 128GB
£249/$192
These cards are expensive, but what you're buying is not just storage capacity but high-speed data storage and the ability to capture high-res video. SanDisk and ProGrade make pro-level cards too.

What to look for in a SD card

All those icons and numbers do actually mean something



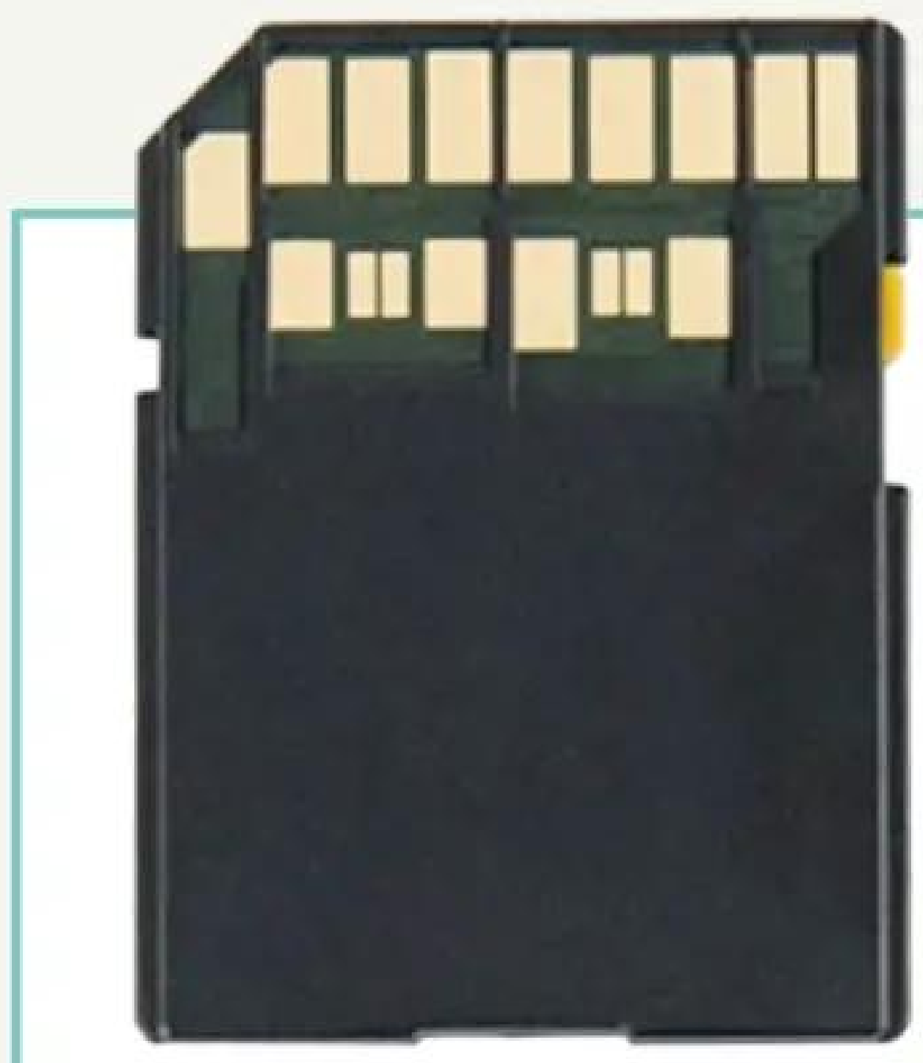
Lock
Quite simply, this lets you lock the card so you don't accidentally delete important shots.

SDXC logo
This indicates that the card conforms to the newest SDXC format. Less expensive cards will often be the older SDHC type. As long as the speed and capacity are what you need (and your camera can use both types), the difference is not that important.

UHS-II
This 'II' icon indicates the card is a faster UHS-II type, with an extra row of electrical contacts on the back. UHS-II cards are faster, but not all cameras have UHS-II compatible memory card slots to take advantage of this extra speed.

Maker's name and product range
Memory card makers typically create several SD card mini-brands for different types of user. Here, 'Professional' is one of Lexar's sub-brands, and indicates its likely audience, not specific performance figures.

Card capacity
This is the easy one! Card capacity is quoted in gigabytes (GB). Within any maker's range or sub-range (like Lexar Professional), the cost of a card is generally roughly proportional to its capacity.



UHS-II double contacts
On the back of UHS-II cards, you'll see two rows of electrical contacts, not one. This offers higher data transfer speeds, which is especially relevant to videographers.

V90, U3 and Class 10 rating
This indicates the memory card's minimum sustained write speed, which is crucial for video recording. U3 is suitable for recording 4K video and is a step up from the common Class 10/U1 rating. V90 is the highest current standard at a minimum 90MB/s, suitable for 8K video.

Maximum card speed
The video Class rating tells you the card's minimum sustained speed, while this one is simply its maximum (not necessarily sustained). It's quoted in megabytes per second (MBps) and, with Lexar cards, also as a 'x' rating.

microSD cards
This is a much smaller SD card variant that's used extensively in action cams and 360 cameras, which still need the same high capacities and data speeds.

Lexar
1800x
64GB
micro SD XC
V90 II
U3
10

High-speed card readers
Regular memory card slots and readers may not be optimised for ultra-high data transfer speeds, so Lexar ships a dedicated card reader for its Professional memory cards.

Lexar
128GB
300 MB/s
V90 II
2000x
Lexar PROFESSIONAL

CSC www.canon.co.uk

Canon EOS R3

£5,879/$5,999

Angela Nicholson finds out whether this flagship mirrorless camera for professionals hits the mark

According to Canon, the EOS R3 sits above the R5 and R6 as its flagship mirrorless camera, but below the EOS-1D X Mark III overall. Nevertheless, it's aimed at the same audience as the company's top-flight DSLR and has a similar build, featuring the same weatherproofing if not quite the same durability.

Inside the R3 is a new 24.1MP full-frame back-illuminated stacked CMOS sensor, which is paired with the Digic X processor. It's a combination that's designed to deliver fast responses with minimal rolling shutter effect. As such, the R3 has a maximum continuous shooting rate of 30fps and a top shutter speed of 1/64000sec when the electronic shutter is in action. Switch to the mechanical shutter and the maximum shooting rate drops to 12fps while top shutter speed is 1/8000sec. These top rates are all possible with full autofocus and metering functionality.

Canon has given the R3 Dual Pixel CMOS AF II, which means it uses phase-detection focusing. It also has an improved Deep Learning algorithm and the tracking system is capable of detecting human bodies, heads, faces and eyes, animal bodies, faces and eyes, and vehicles. The eye, face, head and body detection also all works whatever AF area mode is selected (it can also be disabled). This means you can either specify the area or subject that you want the camera to focus on, or you can let the camera detect the subject and focus on it.

As well as being able to set the active AF point with a tap on the screen or using the joysticks or Smart Controllers on the back of the camera, when the R3's Eye Control AF is activated, the subject can be selected by looking at it in the viewfinder. It selects the subject rather than a specific AF point, and once the subject is selected, the camera tracks it without the need to keep looking at it.

The subject detection works extremely well. When I was photographing a rugby match, for example, it quickly spotted players in the frame and I could select the one to target either using the usual AF point selection options or using the Eye AF control. The eye-detection is sensitive and a blue box indicates which part of the subject has been recognised and is being tracked. This also proves effective with animals, making it easy to capture sharp images of a dog chasing a ball or birds in flight.

The vehicle detection is also good, but there were a few occasions when I was photographing a motorbike when the active area suddenly jumped away from the subject. This was usually when it wasn't quite front on yet was presenting a slim profile. As soon as the bike was front on, or a bit more of the side became visible, it jumped back to the bike.

As you'd expect, the R3 is also a capable video camera. If you want, you can shoot 6K RAW footage, but that eats through the storage and a 128GB CFexpress card is filled within nine minutes (it's not currently possible to record to an Atomos Ninja V or V+). This makes 4K oversampled from 6K a more viable option. The R3's clever AF and subject detection system is not just for stills and you get the full benefits when shooting video too.

Features

Vehicle detection
In addition to people and animals, the R3's subject detection system can be set to search for vehicles. In this case, it auto-focuses on any moving cars, motorbikes or crash helmets in the shot.

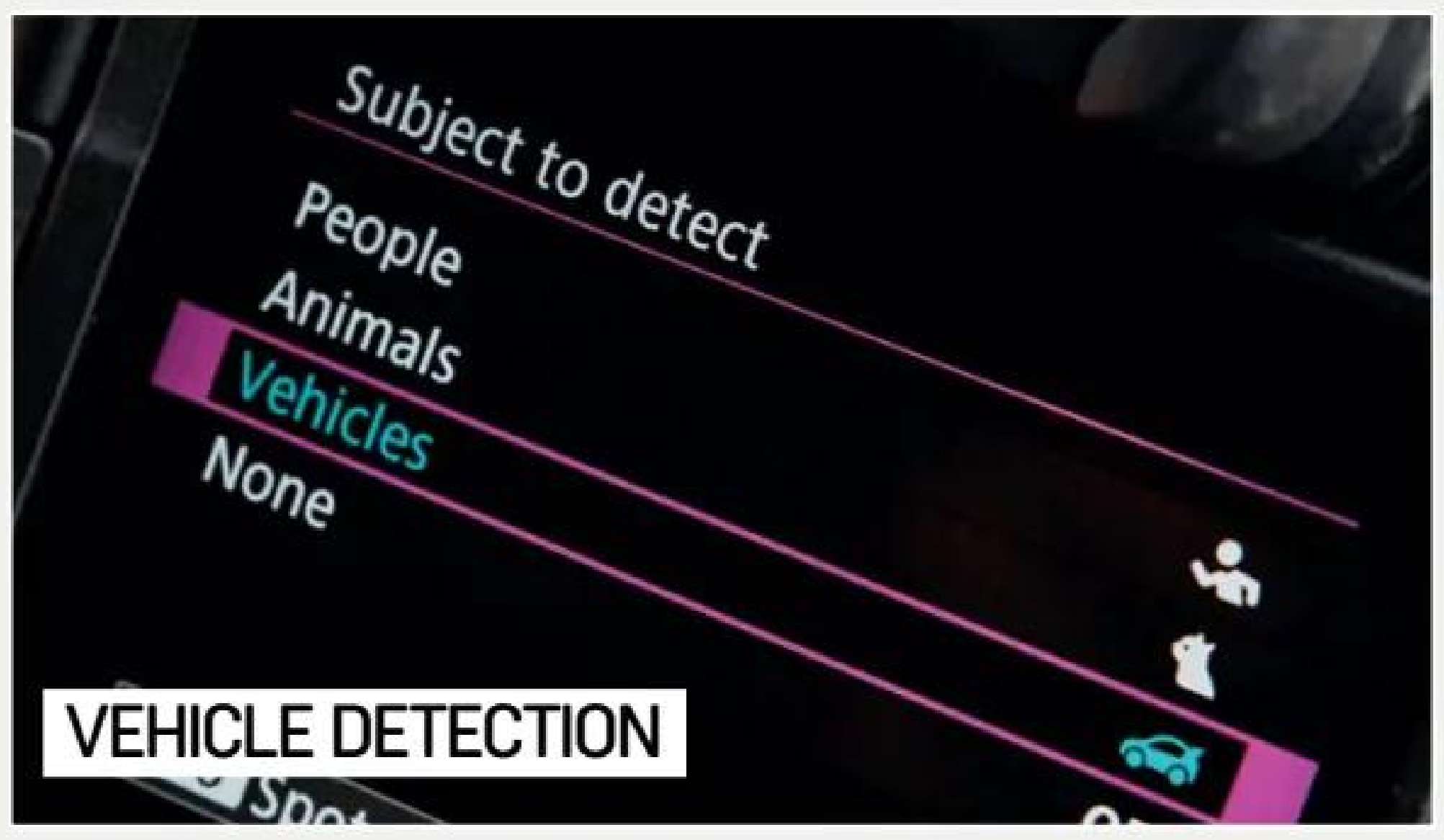
30fps shooting
When the electronic shutter is selected, the R3 can shoot at up to 30fps with full AF and exposure capability. With the mechanical shutter, however, the maximum rate is 12fps.

Image Stabiliser
The R3's in-body image stabilisation works in tandem with the lens-based stabilisation to deliver up to 8-stops of shutter speed compensation for stills and steady hand-held videos.

Flash sync
The R3 can shoot with flash with a maximum sync speed of 1/180 sec with the electronic shutter, 1/200 sec with the mechanical shutter and 1/250sec with the electronic front curtain.

Dual card slots
Alongside its CFexpress type B card slot, the R3 also has a UHS-II compliant SD/SDHC/SDXC card slot. However, you will need a CFexpress card to record video at the highest frame rates.

6K RAW video
The R3 can shoot 6K RAW video at up to 60p in Canon Cinema Raw Light format while 4K video can be created from over sampled 6K footage.



Subject to detect
People
Animals
Vehicles
None

VEHICLE DETECTION

1
Canon
EOS
R3
CANON LENS RF24-70mm F2.8 L IS USM
DRIVE·AF
AF MF
STABILIZER ON OFF
φ82mm

1

RF mount
As it's a full-frame mirrorless camera, the EOS R3 has Canon's RF lens mount.

2

Weather-sealed
While it has the same level of weather-sealing as the EOS-1D X Mark III, the R3's buttons are not as durable.

3

Double-gripped but light
Although it has a fixed vertical grip, the R3 is over 400g lighter than the EOS-1D X Mark III.

DRIVE·AF
EOS
R3
MIC
HDMI
OPEN
2

Canon
EOS R3
M-Fn
DRIVE·AF
M 64000
F00
ISO 102400
MODE
AF-ON
3

Above Fast AF: The R3's AF system is quick to spot subjects such as animals. Once selected, it stays with the subject well

Left Canon colours: In the default settings, the R3 produces vibrant, pleasing colours and plenty of sharp detail

Below Great noise control: Noise is controlled well throughout the native ISO range, even ISO 102,400 produces results that are usable for news reporting

Control-wise, the R3 is closer to the EOS-1D X Mark III than the R5 and it has a twin-grip design. However, you also get a 3.2-inch, 4.15-million-dot, vari-angle touchscreen, which makes it easier to compose images and adjust settings when the camera is above or below head height.

There's also a 0.5-inch, 5.76-million-dot, OLED viewfinder, which gives a clear, crisp view with plenty of detail. If the camera is set to use the electronic shutter, a white frame flickers around the edge of the image in the viewfinder and on the screen when it's shooting. With a top-shooting rate of 30fps, it's worth checking which drive mode the camera is set to before you photograph a motionless subject, as it's easy to blast out a dozen or more images without realising it.

Like the screen on the back of the camera, the viewfinder gives an accurate preview of the image and can be used as a guide to setting the exposure, white balance and Picture Style. On the whole, the Standard Picture Control and Auto White balance settings work well and there's only an occasional need for the exposure compensation, but never when you wouldn't anticipate it.

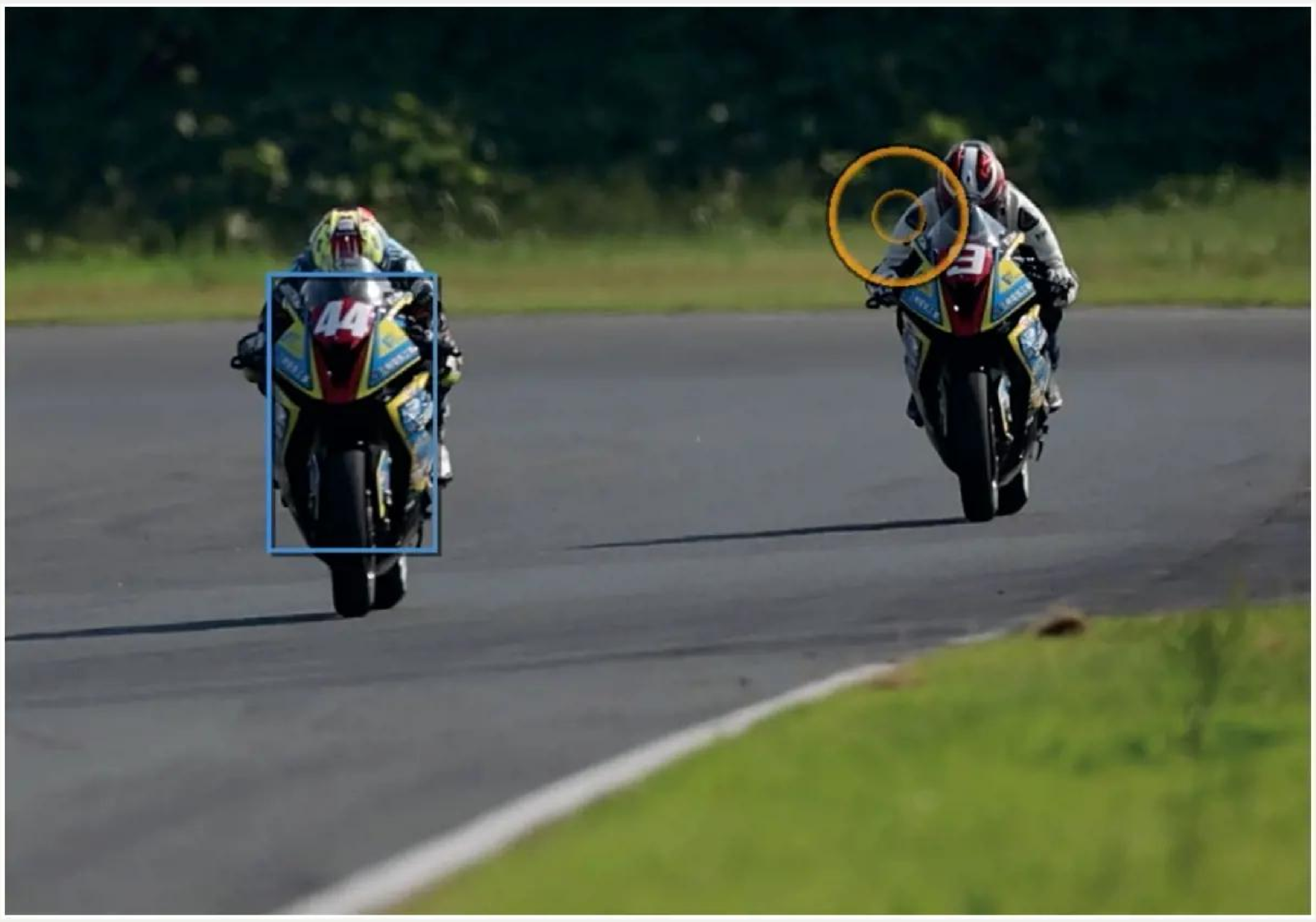
While it's worth using the lower to mid-range sensitivity settings, the R3 controls noise extremely well and the results at ISO 102,400, the top standard setting, are good. Naturally, there is noise visible in the RAW files, but it's fine-grained and evenly distributed. The simultaneously-captured JPEGs have no sign of noise and a drop in detail, but they are usable for news reporting. Dropping to ISO 25,600 or 12,800 sees an impressive step up in the level of detail.

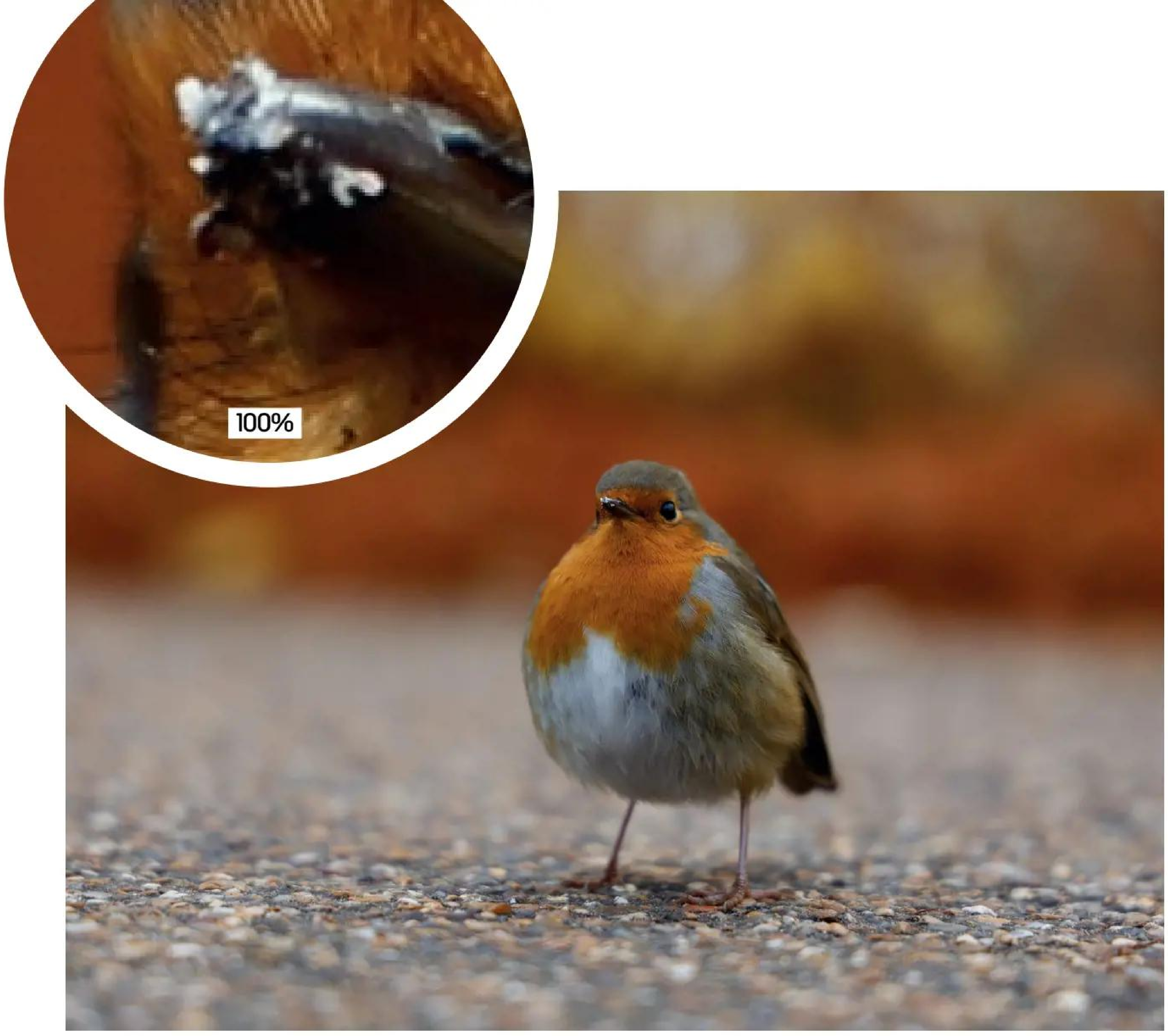
Eye Control AF

The R3 reintroduces Eye Control AF, a feature that we last saw in the 1990s and which enables the AF point to be selected by your eye in the viewfinder. It works in harmony with the R3's subject detection system, so rather than looking at an AF point, when the system is active, just look at the subject to tell the camera what you want it to focus on.

Before you can use the Eye Control AF, it needs to be calibrated, which doesn't take long. However, it is worth refining it so that the camera recognises what you're looking at in a range of situations and lighting conditions. You can also make up to six separate calibrations, for example, for different photographers or if you sometimes change or remove spectacles.

It takes some getting used to and it's not suited to every situation, but the Eye Control AF can make selecting and switching between subjects almost seamless.





CANON EOS R3

Megapixels (effective)	24.1MP
Max resolution	6000x4000
Sensor information	Full-frame BSI stacked CMOS
Shutter speed	Mechanical shutter: 30-1/8,000 sec and Bulb, Electronic shutter: 30-1/64,000 sec
ISO sensitivity	Stills: ISO 100-102,400 to ISO 50-204,800, Video: ISO 100-25,600 to 100-102,400
Exposure modes	Flexible priority, Program, Shutter priority, Aperture priority, Manual, Bulb and Custom (x3)
Metering options	Evaluative, Partial, Spot metering, Centre weighted average
Flash modes	E-TTL II Auto Flash, Manual
Connectivity	USB-C, HDMI Micro (Type D), 3.5mm, N3-type remote control terminal, wireless LAN, Bluetooth
Weight	1015g with card and battery
Dimensions	150 x 142.6 x 87.2mm
Batteries	Rechargeable Li-ion LP-E19
Storage	CFexpress type B and SD/SDHC/SDXC UHS-II
LCD	3.2-inch 4.15-million-dot Clear View LCD II
Viewfinder	0.5-inch 5.76 million-dot OLED

FEATURES

While some may wish for higher resolution, the R3 has an excellent spec for sports photographers

★★★★★

BUILD QUALITY

It may not be quite as robust as the EOS-1D X Mark III, but the R3 still feels like a solid and well-built camera

★★★★★

HANDLING

There's a superb blend of physical controls and touch control with everything in easy reach

★★★★★

QUALITY OF RESULTS

Blistering AF, excellent subject detection and great noise control ensures fabulous results

★★★★★

VALUE FOR MONEY

Cutting-edge technology doesn't come cheap and the R3's price will only be justifiable to pros

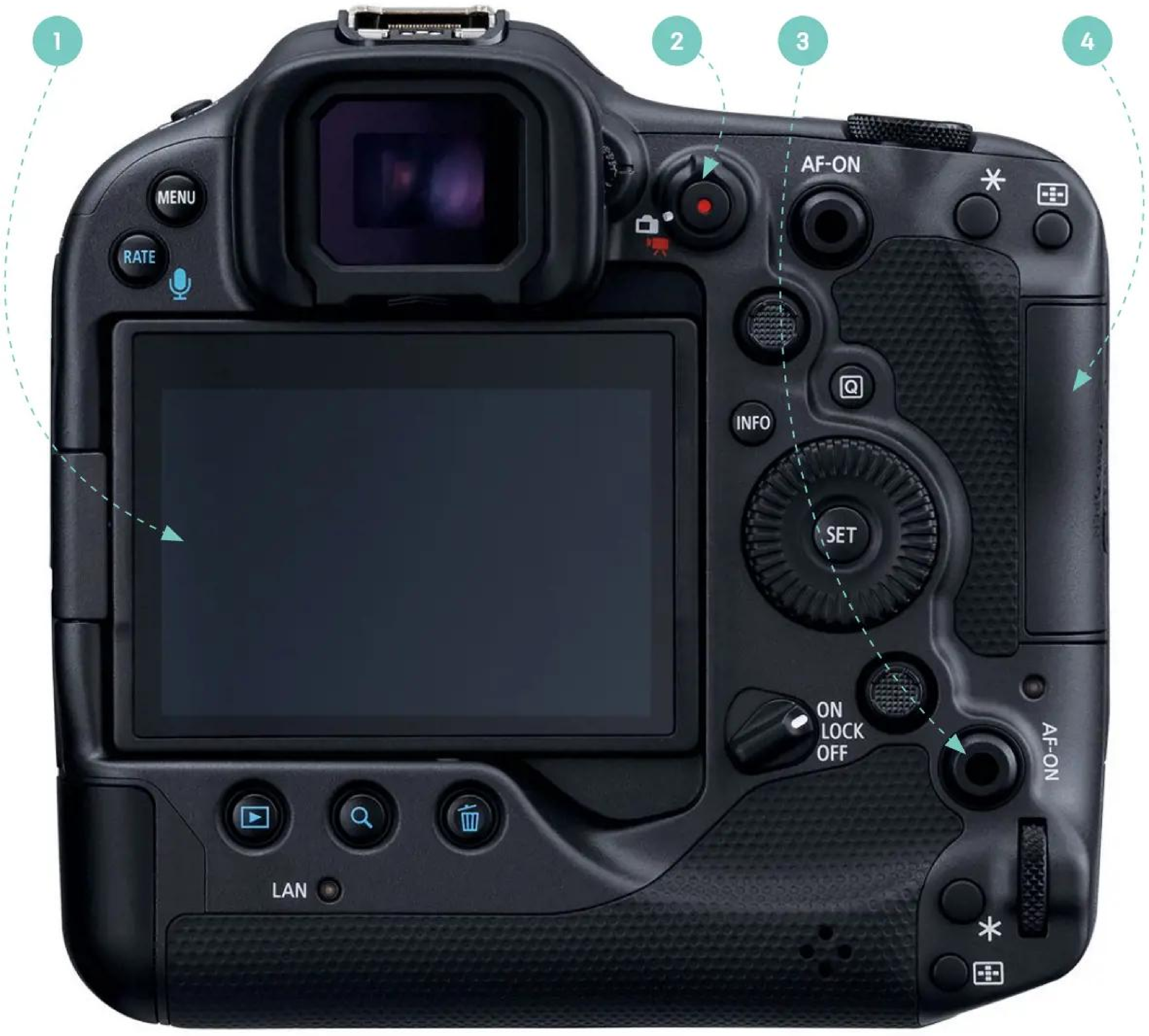
★★★⯪☆

Overall

The R3 is a phenomenal camera with an incredible subject detection system that makes capturing action images a breeze for anyone who can afford the price tag

★★★★★

> *"When the R3's Eye Control AF mode is activated, the subject can be selected simply by looking at it in the viewfinder"*

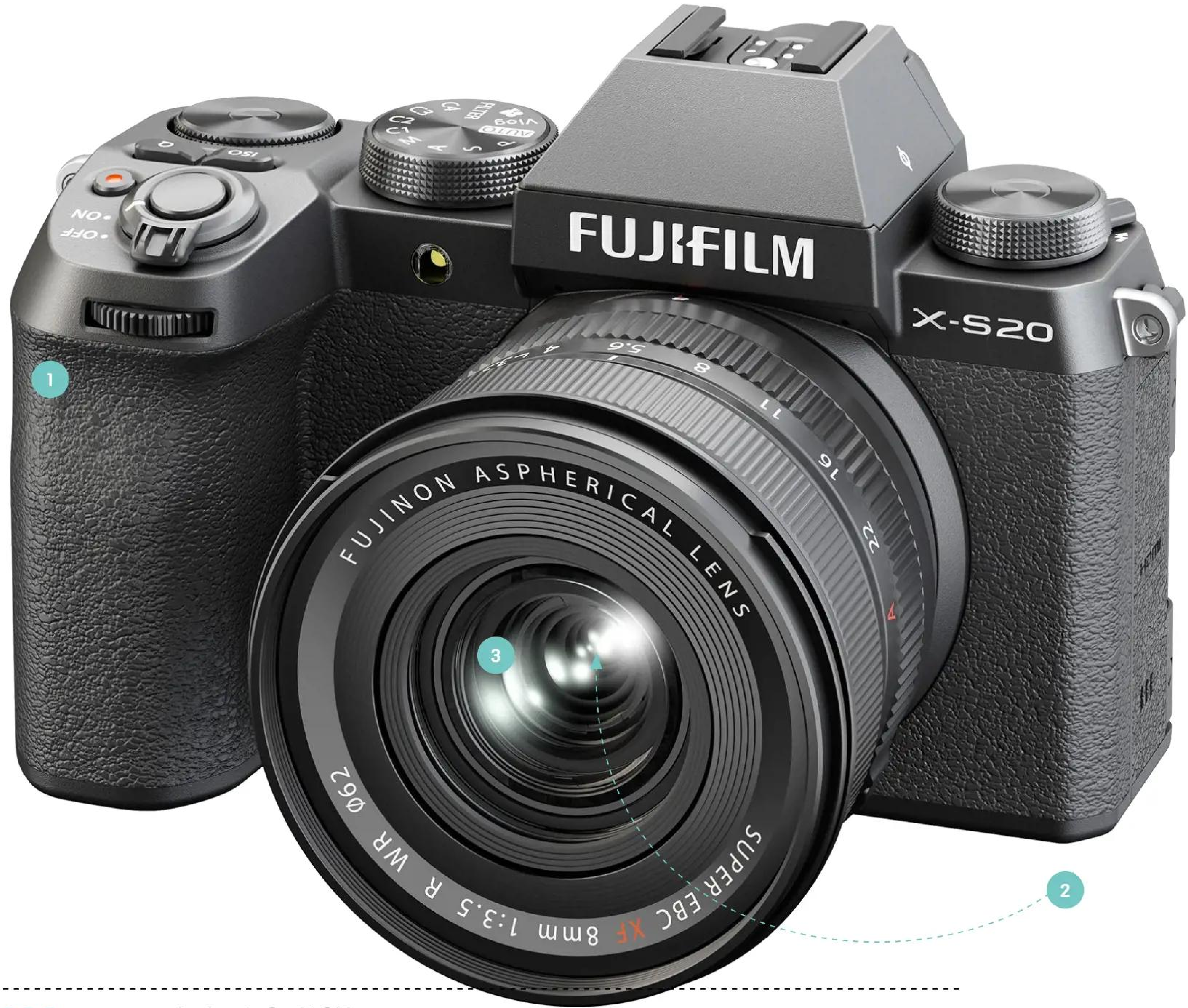


① **Vari-angle screen**
The 3.2-inch vari-angle screen isn't restricted by a microphone plugged in the 3.5mm port.

② **Duplicate controls**
Each grip has a dedicated Smart Controller (AF-On) to make switching orientation easy.

③ **Stills or video**
The Stills/Video switch allows you to see the dedicated menus for easier setting selection.

④ **Familiar battery**
The R3 uses the same LP-E19 battery as the EOS-1D X Mark III, it slides and locks in place.



1

Large battery
The X-S20's battery is rated for 800 frames on a single charge, double that of the X-S10.

2

Lens options
The X-S20 is also available in a kit with an XF18-55mm lens, or an XC15-45mm lens.

3

Powerful sensor
The X-S20 continues with the same sensor as the X-S10: a 26.1MP X-Trans IV BSI CMOS.

CSC www.global.fujifilm.com

Fujifilm X-S20

£1,249/$1,299 (body only)

Fujifilm's do-it-all camera gets extra battery life and 6K video

SPECIFICATIONS

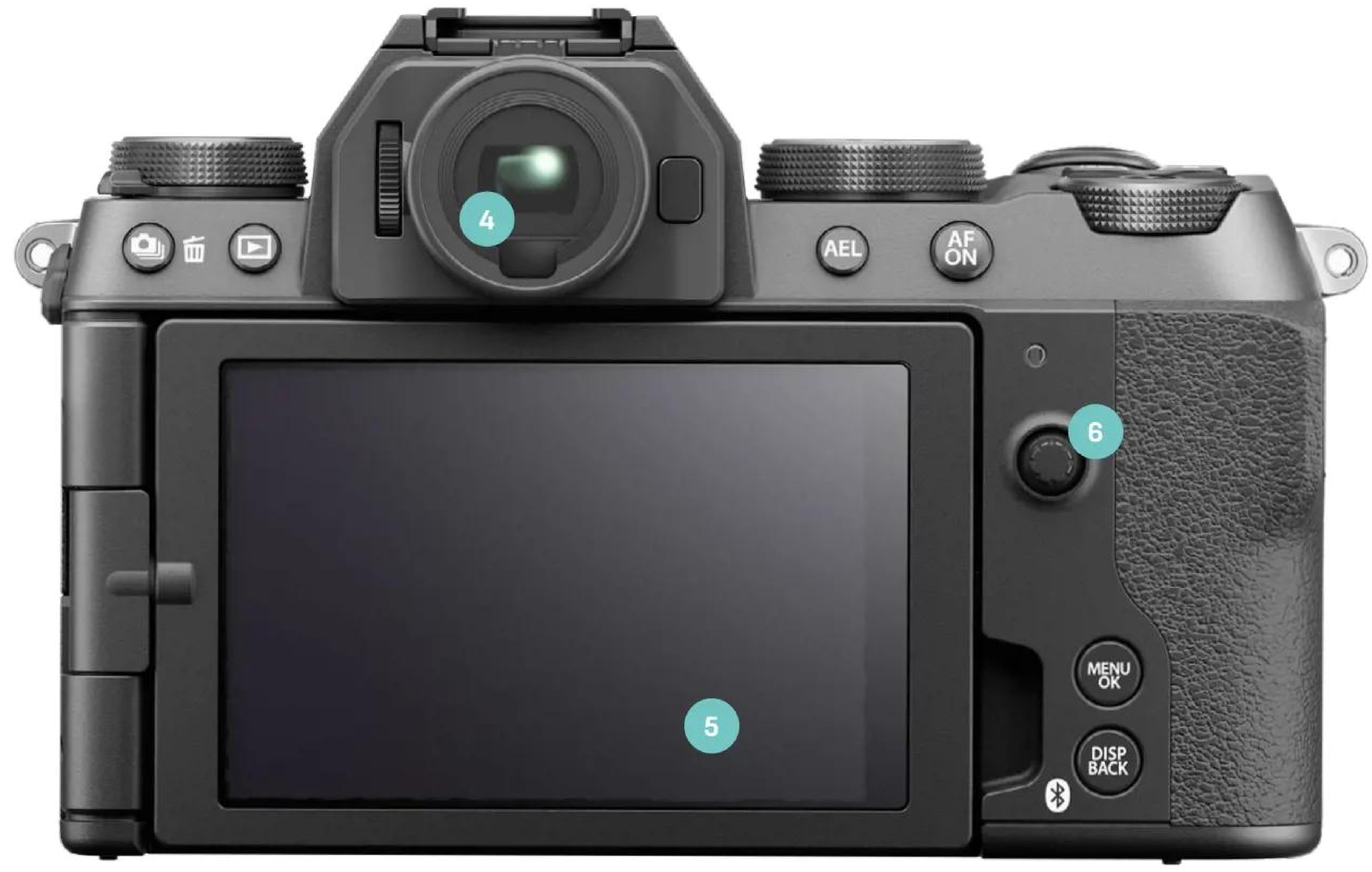
Sensor_ 26.1MP Fujifilm X-Trans IV (APS-C)
Image processor_ Fujifilm X-Processor V
Autofocus_ 117/425/91-point hybrid contrast/phase AF
Stabilisation_ 5-axis in-body; 7-stops
ISO Range_ 160 to 12,800 (exp 80-51,200)
Shutter_ 1/4000 sec (mechanical) 1/32000 sec (electronic)
Max burst_ Up to 30fps (1.25x crop) or 20fps (no crop)
Video_ Up to 6K 30P 4:2:2 10-bit internal, 4K 60P, 1080 HD 240P
Viewfinder_ 2.36 million dot
LCD screen_ 3-inch 1.84 million dot vari-angle LCD touchscreen
Memory card_ 1 x SD/SDXC UHS-II
Connectivity_ WiFi, Bluetooth, FujifilmXApp, USB-C, HDMI Micro
Weight_ 491g (body only)

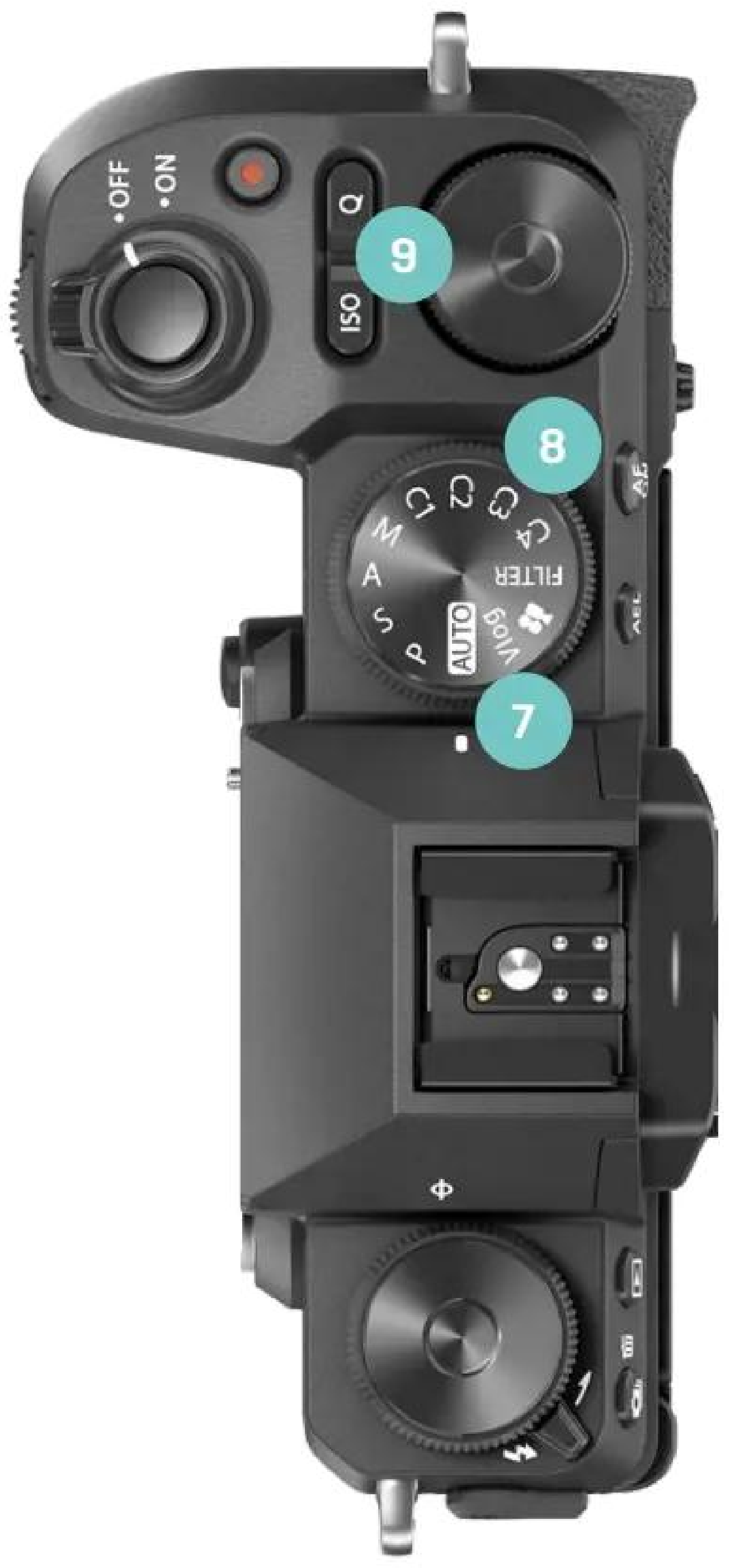
Fujifilm's X-S series of cameras is positioned as a versatile and user-friendly camera, aimed at enthusiast photographers, as well as content creators and vloggers who want a powerful camera that is also simple to pick up and use. The X-S10 was released by Fujifilm in November 2020 and offered a lot of the cutting-edge tech from Fujifilm's larger cameras at the time, such as the X-T4, but in a more compact and easier-to-use chassis. The X-S20 continues to share this ethos, taking the processor and battery from Fujifilm's latest flagship X-Series cameras.

Key features

The standout feature of the X-S20 is its enhanced battery, which Fujifilm claims can capture an additional 800 frames on a single charge compared with the previous version. The X-S20 has a 2.36 million dot electronic viewfinder and a fully articulating 1.84 million dot LCD screen, which is perfect for easy handheld vlogging.

Equipped with the previous generation X-Trans IV back-side illuminated CMOS sensor, the X-S20 delivers 26.1-megapixel images. The camera incorporates 5-axis in-body image stabilisation, providing up to seven stops of stabilisation when used with a compatible lens. The





4 Viewfinder
The X-S20's EVF is a 2.36M-dot OLED unit and offers 0.62x magnification.

5 Articulating LCD
The rear LCD touchscreen can rotate and flip forward for quick and easy vlogging.

6 Joystick control
Focus points can be set via the joystick control if you would prefer not to use the touch screen.

7 Vlog mode
In a nod towards content creators, a dedicated Vlog mode has been added...

8 More options
...it takes the number of mode dial positions to 12, with four still being user-definable.

9 Retained buttons
The ISO button and the Q quick access button have been retained from the X-S10 model.

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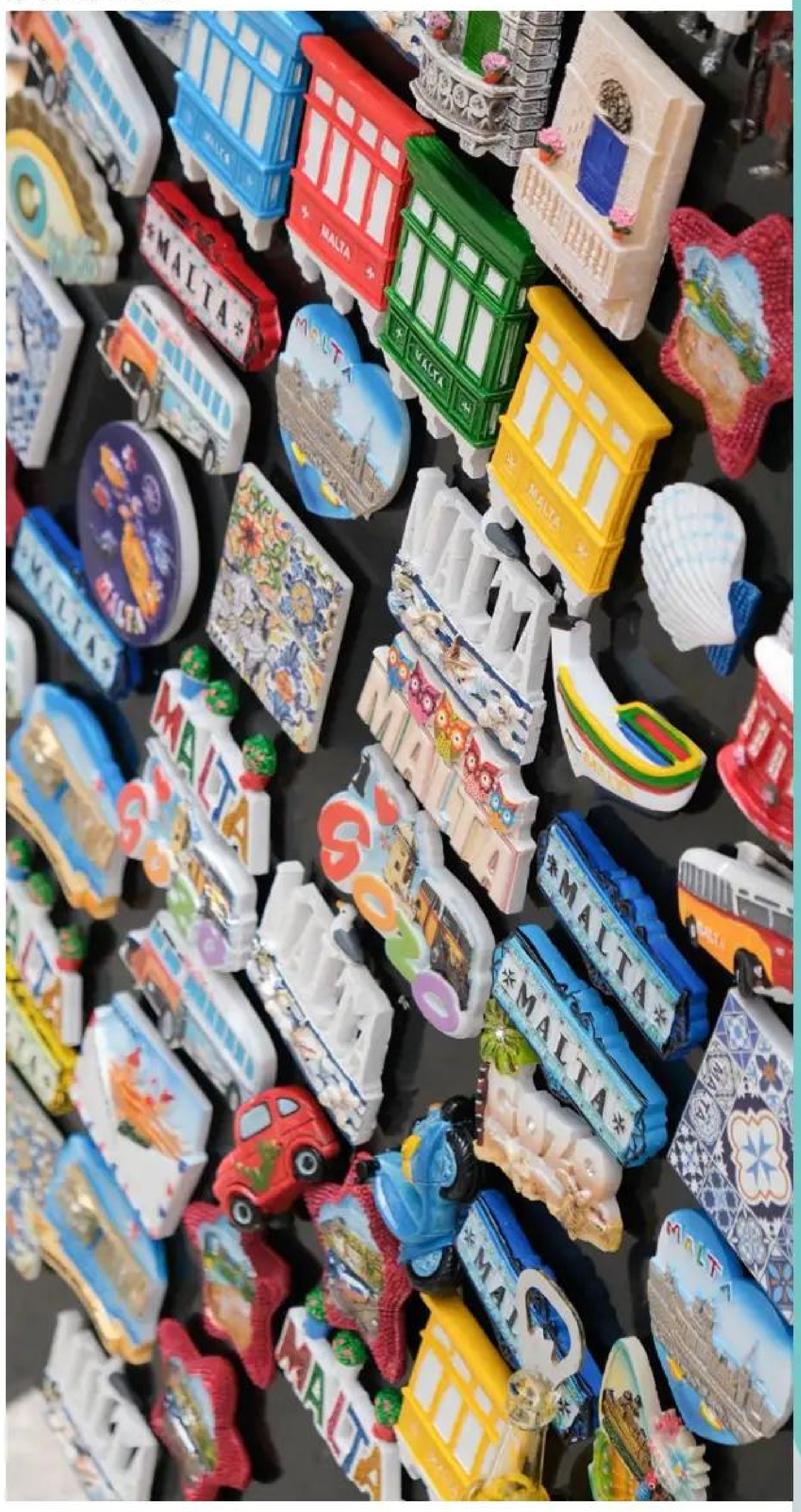


In true Fujifilm fashion, the X-S20 supports all of its film simulations, offering a total of 19 classic looks that can be applied to both images and videos.

> *"This camera is perfect for anyone who wants to play with the look of their photos without having to edit them extensively"*

X-S20 pairs this sensor with the latest X-Processor 5, enabling Fujifilm's powerful new subject-recognition and auto-tracking. Using deep learning technology, the camera can now recognise and track various subjects.

The X-S20 now supports internal recording of 6.2K 30p video in 4:2:2 10-bit format. It can also output Apple ProRes RAW externally when connected to an Atomos device via HDMI or use Blackmagic RAW with the Blackmagic Design Video Assist 12G. Furthermore, it allows for recording in Fujifilm F-Log, providing a wider range for colour grading in post-production, along with 13+ stops of dynamic range. With its 4K capabilities up to 60p and 1080p HD at 240fps, the X-S20 offers a range of versatile video recording options for users.

A new feature introduced in the X-S20 is the 'Vlog' mode on the main dial. This mode provides easy access to vlogging-specific settings, with large controls tailored for vlogging functions including Product Priority Mode, which enhances recognition and focus on products shown to the camera, and Background Defocus Mode, which increases background blur in videos.

Additionally, the X-S20 can be connected to the TG-BT1 tripod grip for added control during recording. Of course, in true Fujifilm fashion, the X-S20 supports all of its film simulations, offering a total of 19 classic looks that can be applied to both images and videos.

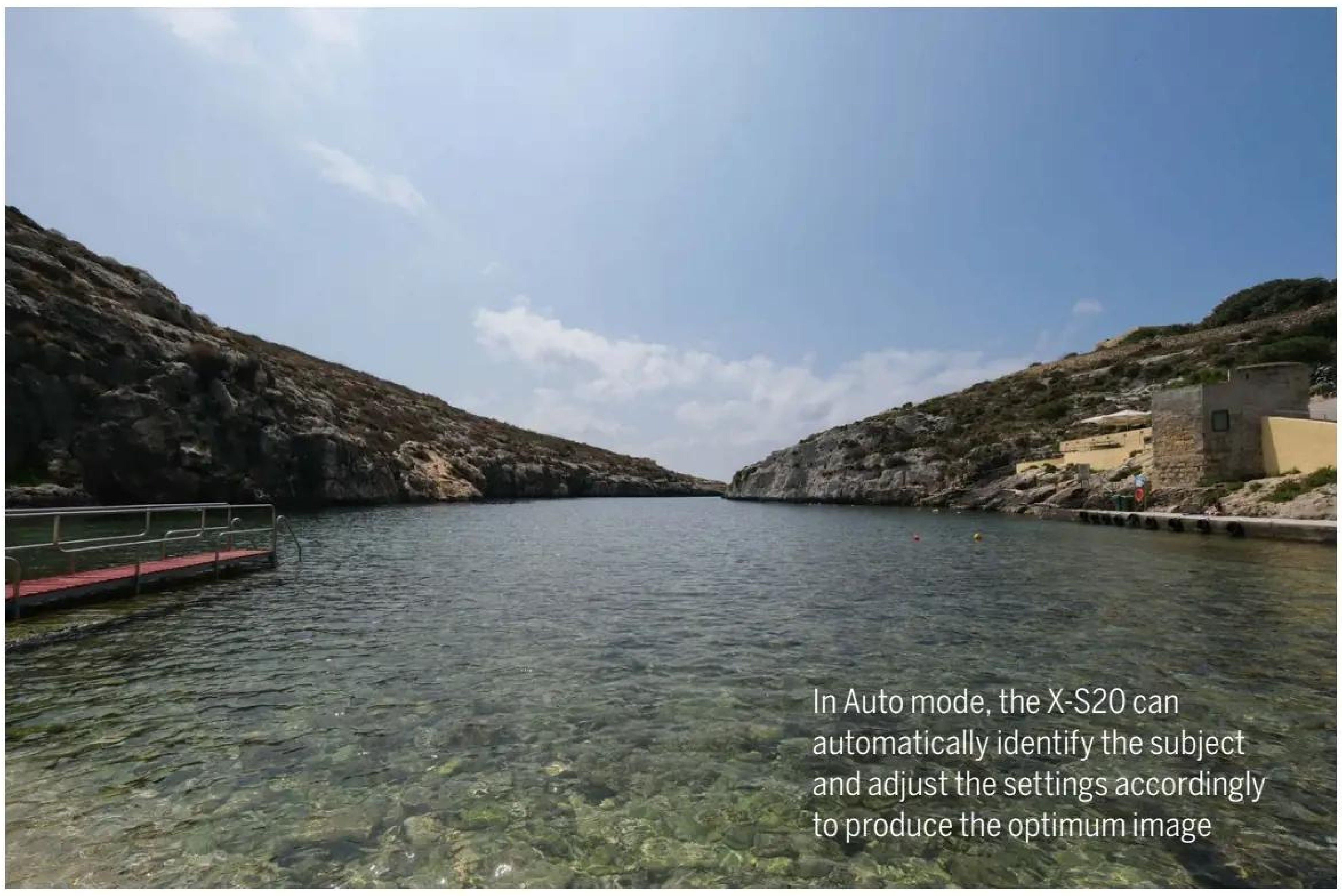
Build and handling

The X-S20 fundamentally looks and feels the same as its predecessor. The body is the same, down to the button and dial layout, but this is no bad thing, as the X-S10 offered a much simpler and more versatile layout than many of Fujifilm's cameras, with its two main top dials being unmarked and customisable.

The LCD screen is fully articulated, which I found useful while testing and trying to shoot up high over obstacles and is essential for any vlogger. Finally, there is a little pop-up flash built in to the top of the viewfinder, which seems to be becoming an increasing rarity in modern cameras.

Performance

The 26.1 MP sensor in the X-S20 is more than enough to create exceptional images. Larger megapixel counts can be tempting, but are often overkill, with increased file sizes and



In Auto mode, the X-S20 can automatically identify the subject and adjust the settings accordingly to produce the optimum image

© Gareth Bevan

processing time during editing. The X-Trans IV sensor used in the X-S20 has been tried and tested in many Fujifilm cameras before, and has always delivered on image quality, and the X-S20 is no different. The images are incredibly sharp and detailed for a smaller APS-C sensor, even when cropping in quite close. The dynamic range of the sensor is impressive for a sensor of this size.

Of course, Fujifilm is also renowned for its colour science and Film Simulations, and we love the way jpegs from this camera look. Even in just the camera's standard Provia setting, the colours are beautifully rendered. This camera is perfect for anyone who wants to play with the look of their photos without having to edit them extensively.

The biggest revelation is the camera's extremely snappy autofocus. The camera almost instantly locks onto targets, and only struggles when trying to focus at the near focus limit of the lens. The human subject tracking modes work excellently, with the camera picking up the eyes and faces of subjects almost without fail.

Video performance is where Fujifilm has really stepped it up and made the X-S20 the camera to own for hybrid content creators. The most impressive thing about this camera is just how much Fujifilm opened up its video features. With open-gate 6.2K video recording, as well as internal 4:2:2 10-bit recording, and capable of outputting in Apple ProRes RAW or Blackmagic RAW externally with the relevant device.

Meet the rivals...

The cameras taking on the Fujifulm X-S20...

Nikon Z50

£849/$859

This is a fantastic enthusiast mirrorless camera (at an even more fantastic price), and proves that Nikon has a clear vision for its Z-mount system.

★★★★★

Canon EOS R7

£1,349/$1,499 (body)

The Canon EOS R7 is the first camera you will reach for if you want the advantages of APS-C combined with pro-level speed and AF, alongside big-time image resolution.

★★★★★

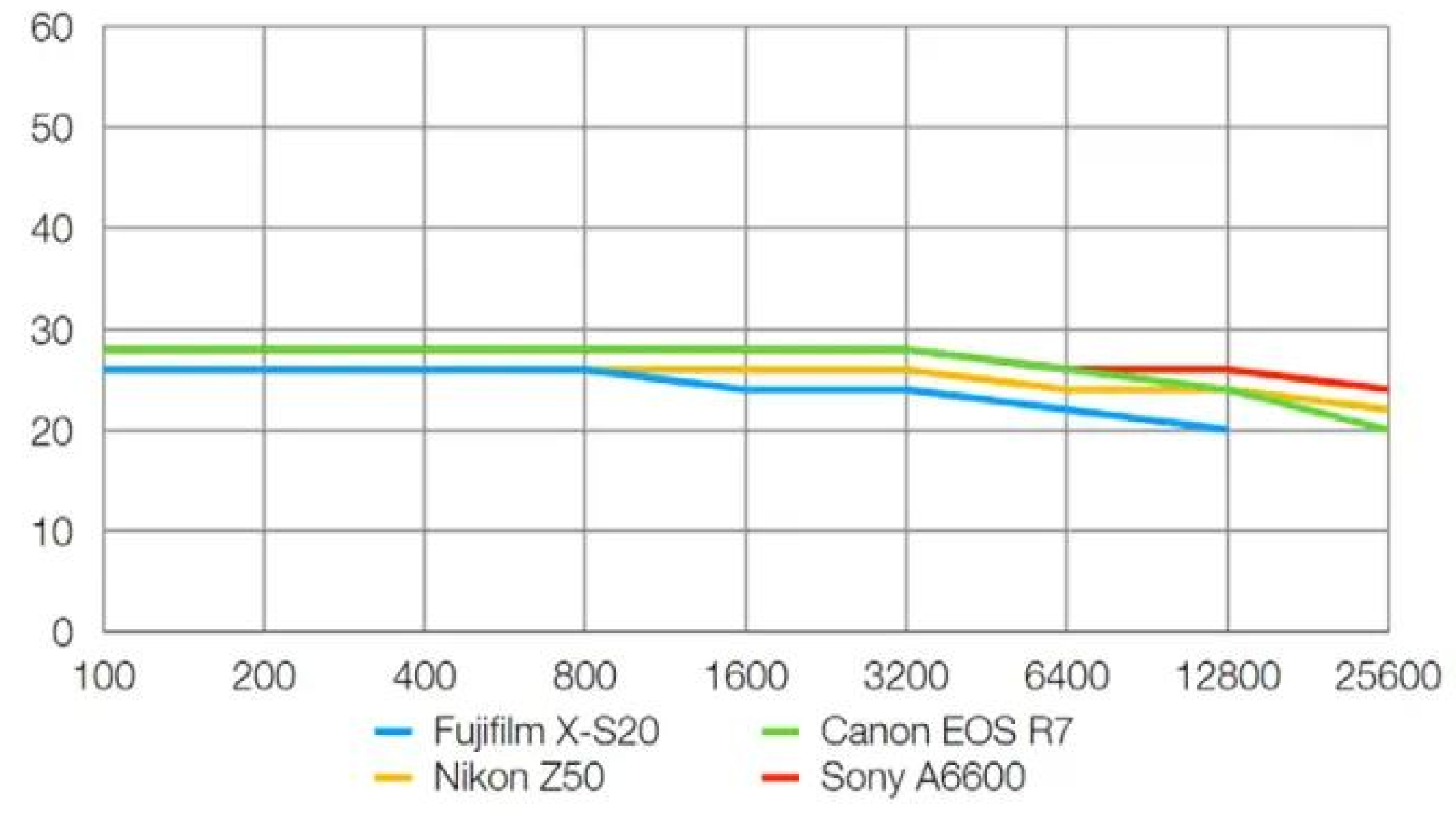
Sony A6600

£1,399/$1,399

With a 24.2MP sensor and Bionz X image processor, Sony has gone to town with the A6600's advanced autofocus and subject tracking capabilities.

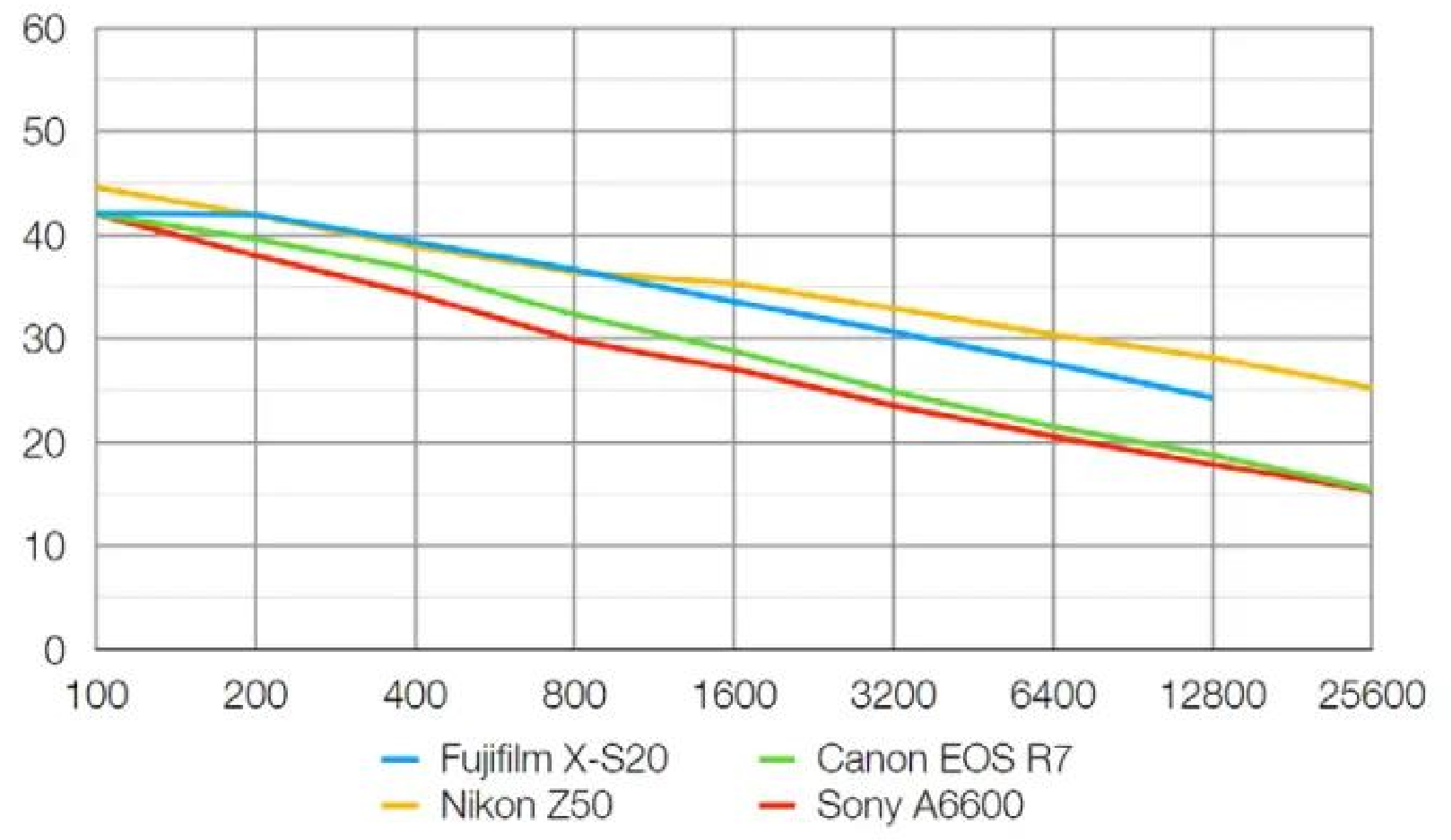
★★★★★

RESOLUTION



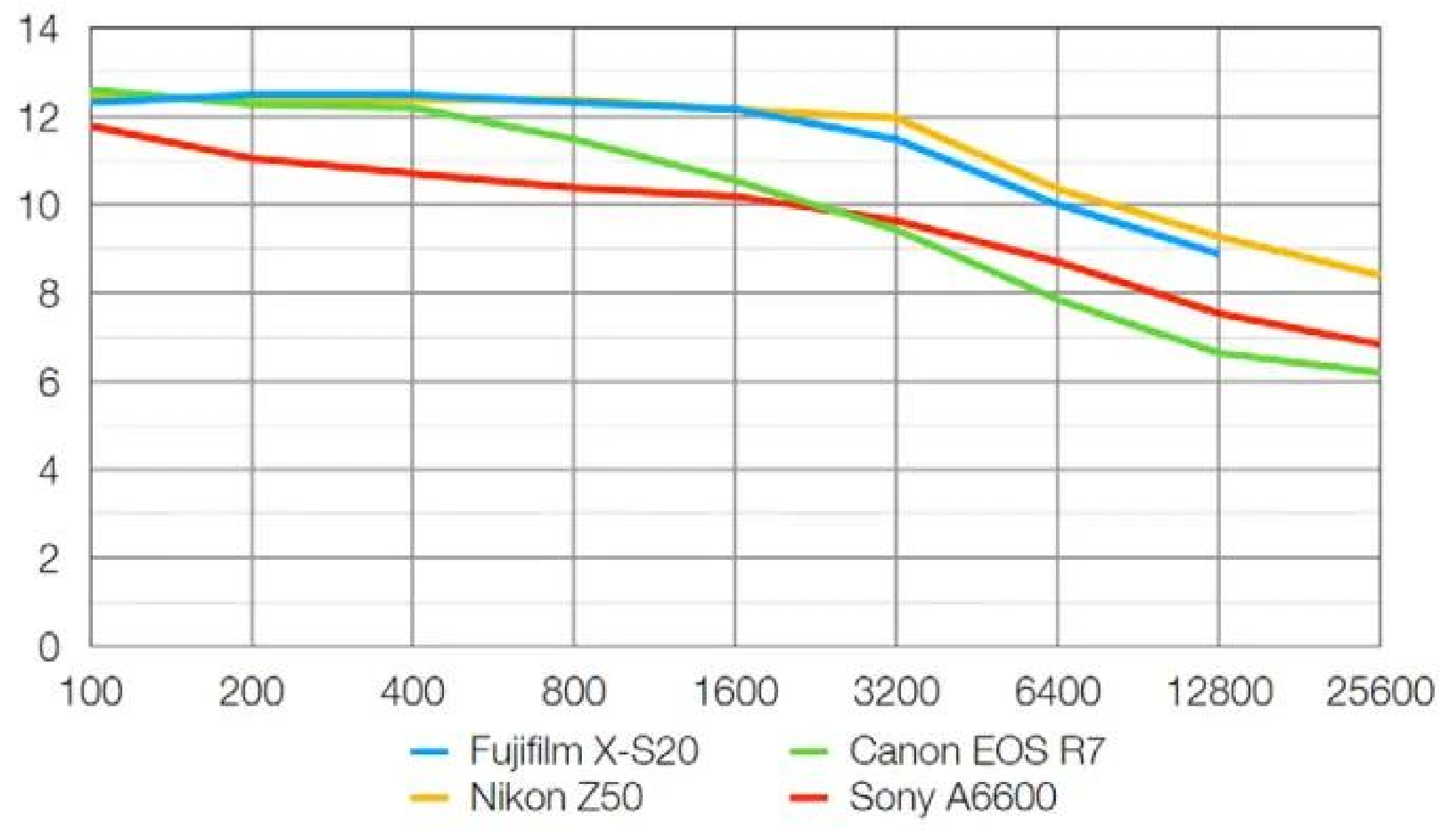
Surprisingly the 26.1MP X-S20 falls slightly behind the 20.9MP Z50 in this test, though the real-world difference in detail capture is negligible.

SIGNAL-TO-NOISE RATIO



The X-S20 does well to almost equal the class-leading Z50 when it comes to noise levels. The 26.1MP X-S20 never produces significantly more noise than the Nikon Z50.

DYNAMIC RANGE (EV)



The X-S20's dynamic range performance is strong, being mostly level with the Z50 throughout the tested sensitivity range.

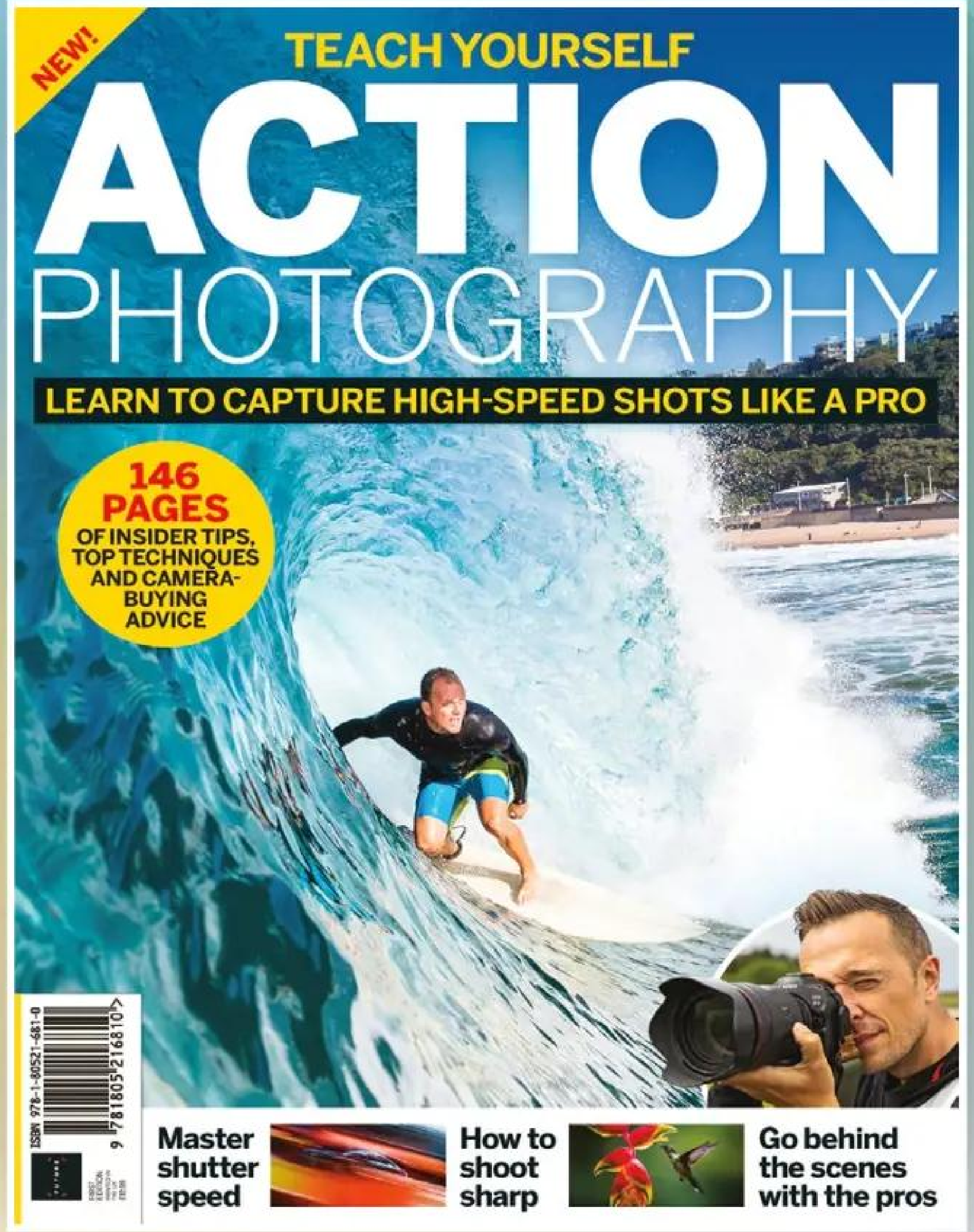
WE SAY...

The Fujifilm X-S20 is the perfect camera for most people, with its very straightforward controls, excellent fully automatic modes, and its small and compact size.

VERDICT

FEATURES	★★★★★
BUILD & HANDLING	★★★★★
PERFORMANCE	★★★★★
VALUE	★★★★☆
OVERALL	★★★★★

Teach yourself Black & White Photography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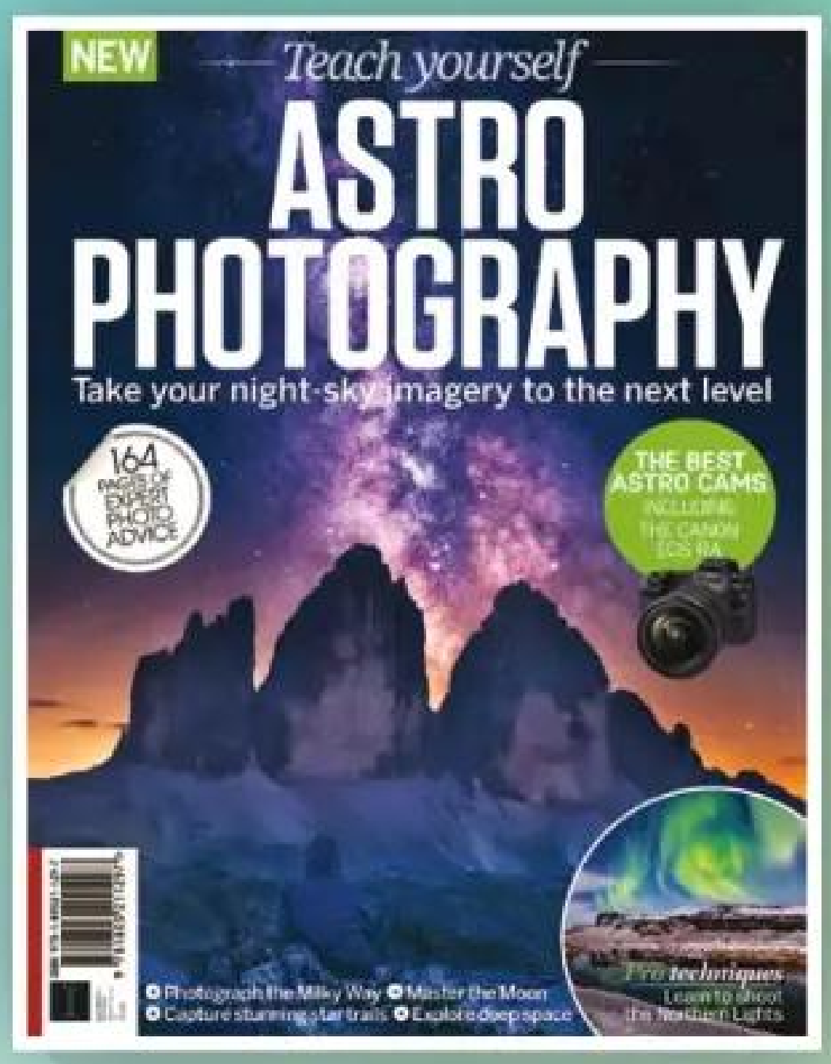
146 PAGES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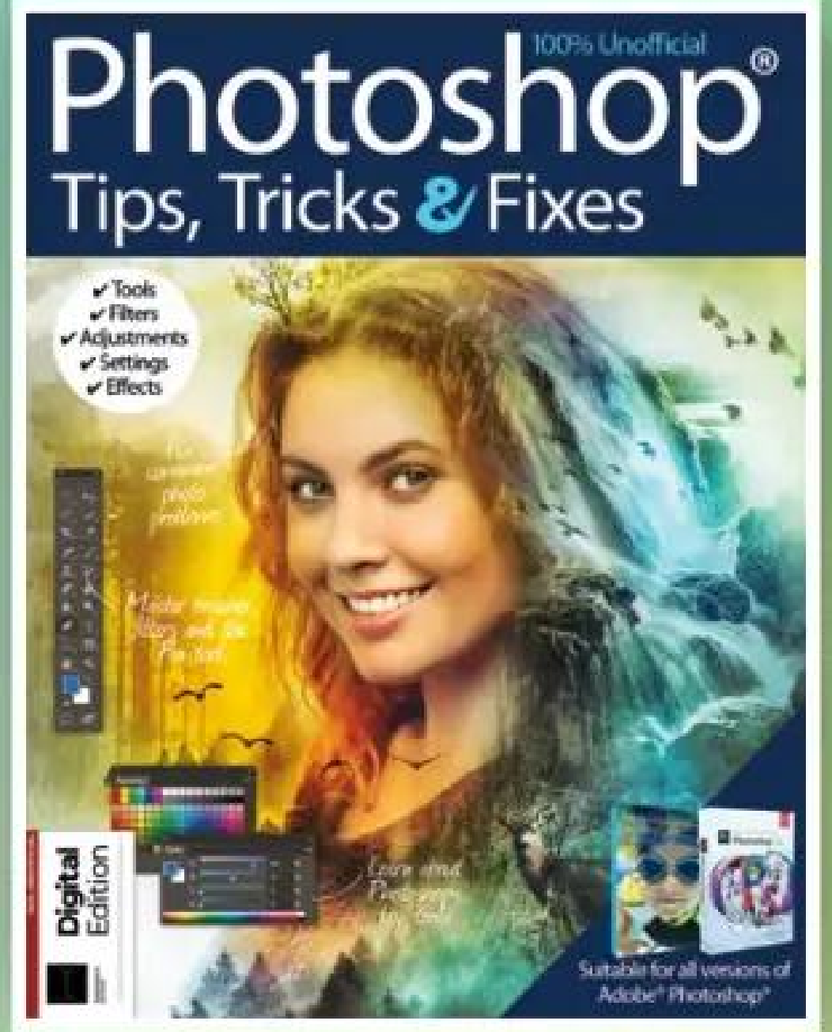
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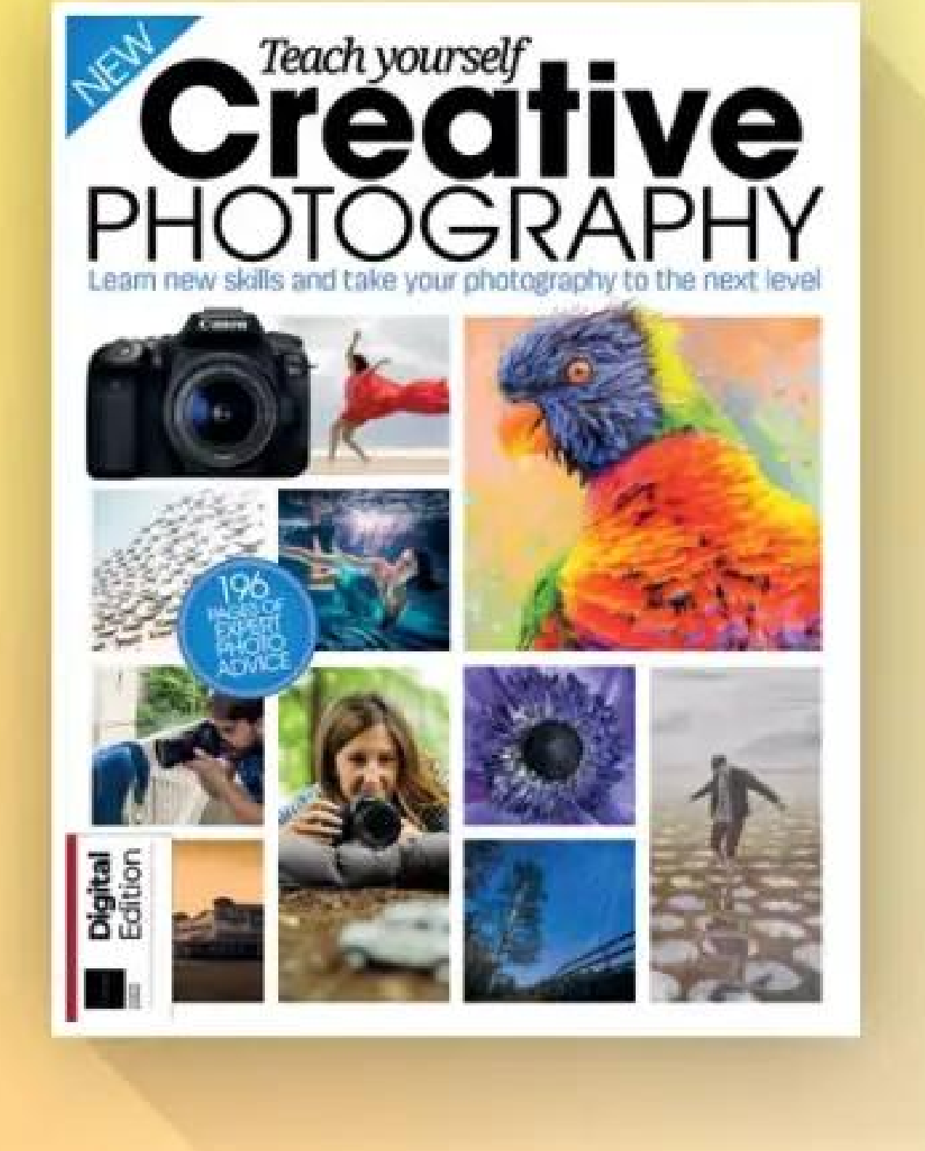
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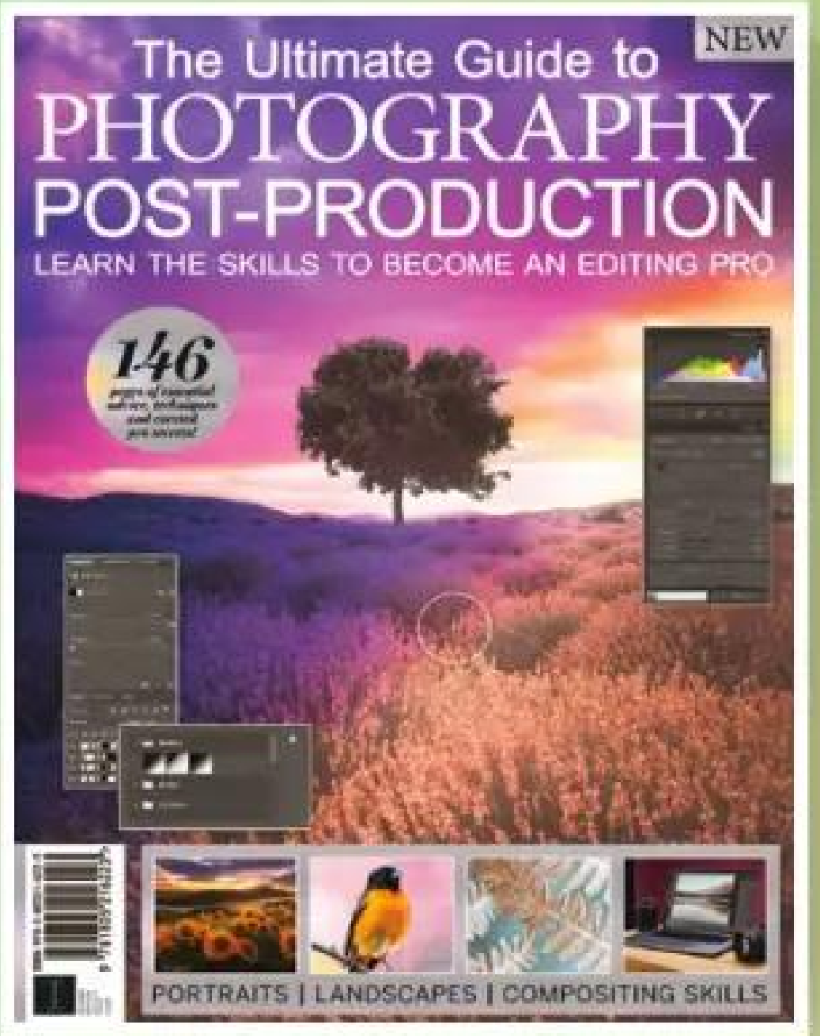
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Nikon Advanced Handbook

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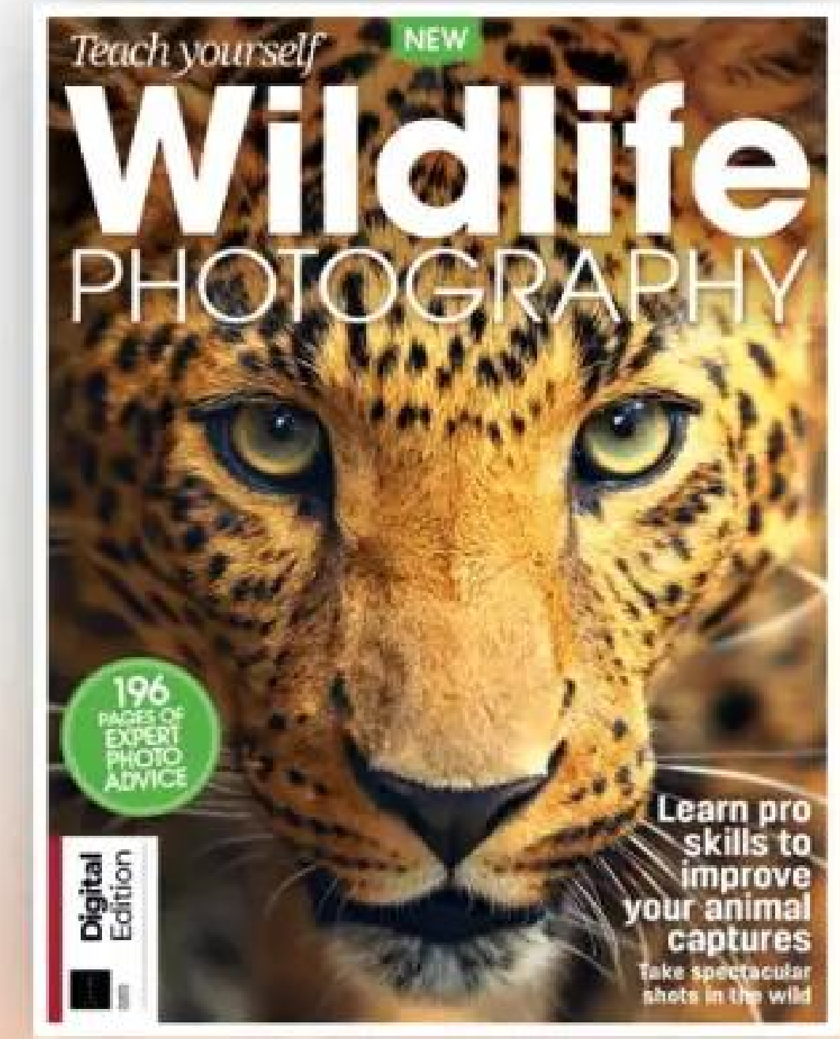
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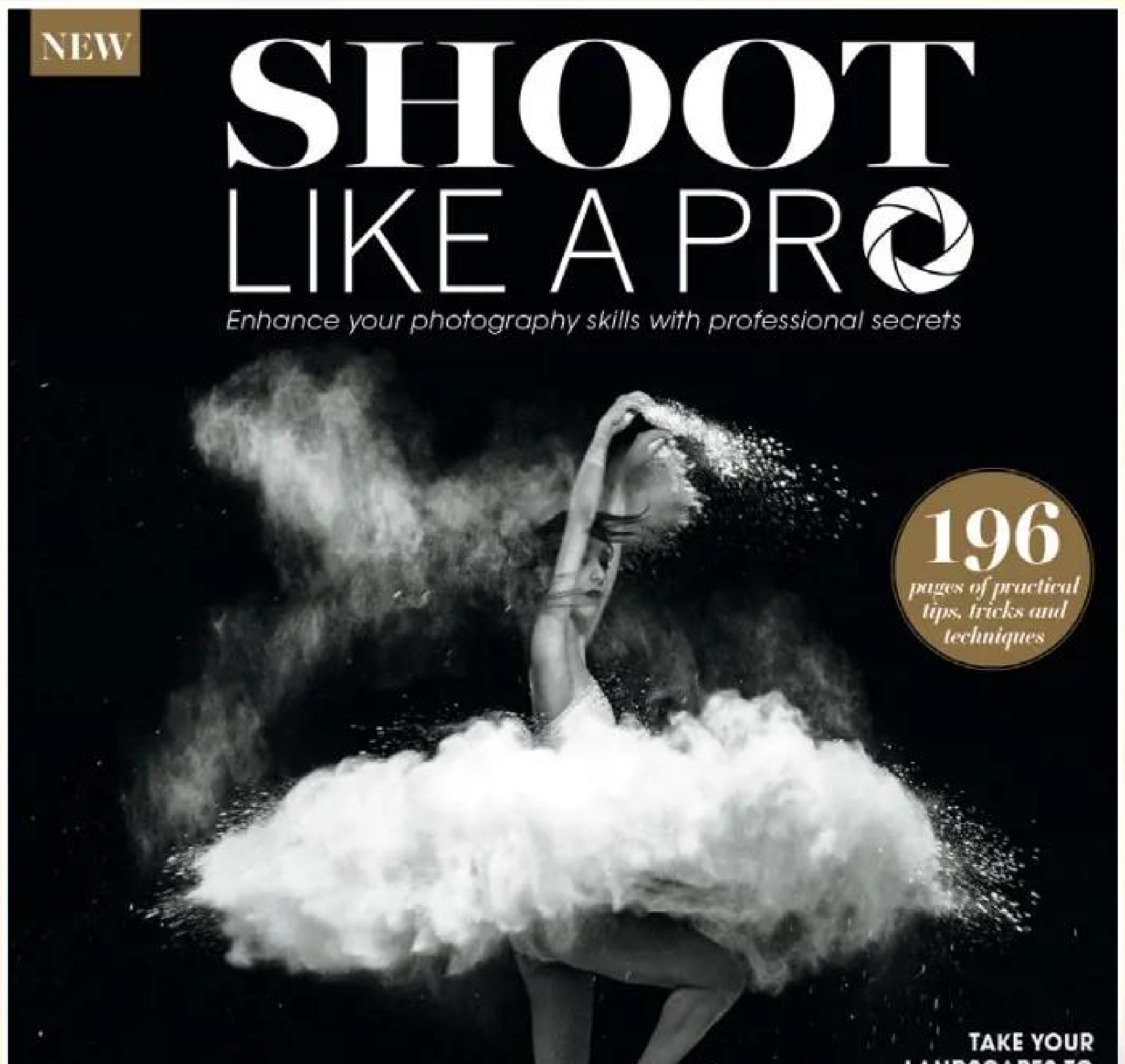
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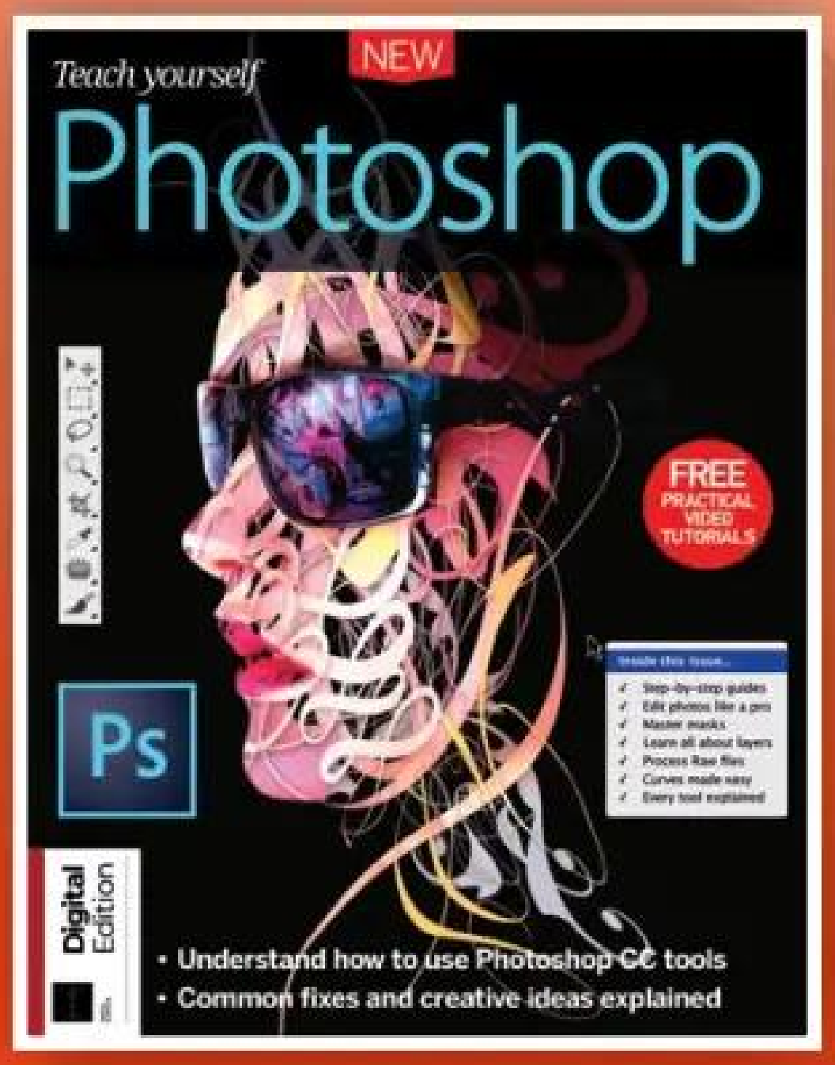
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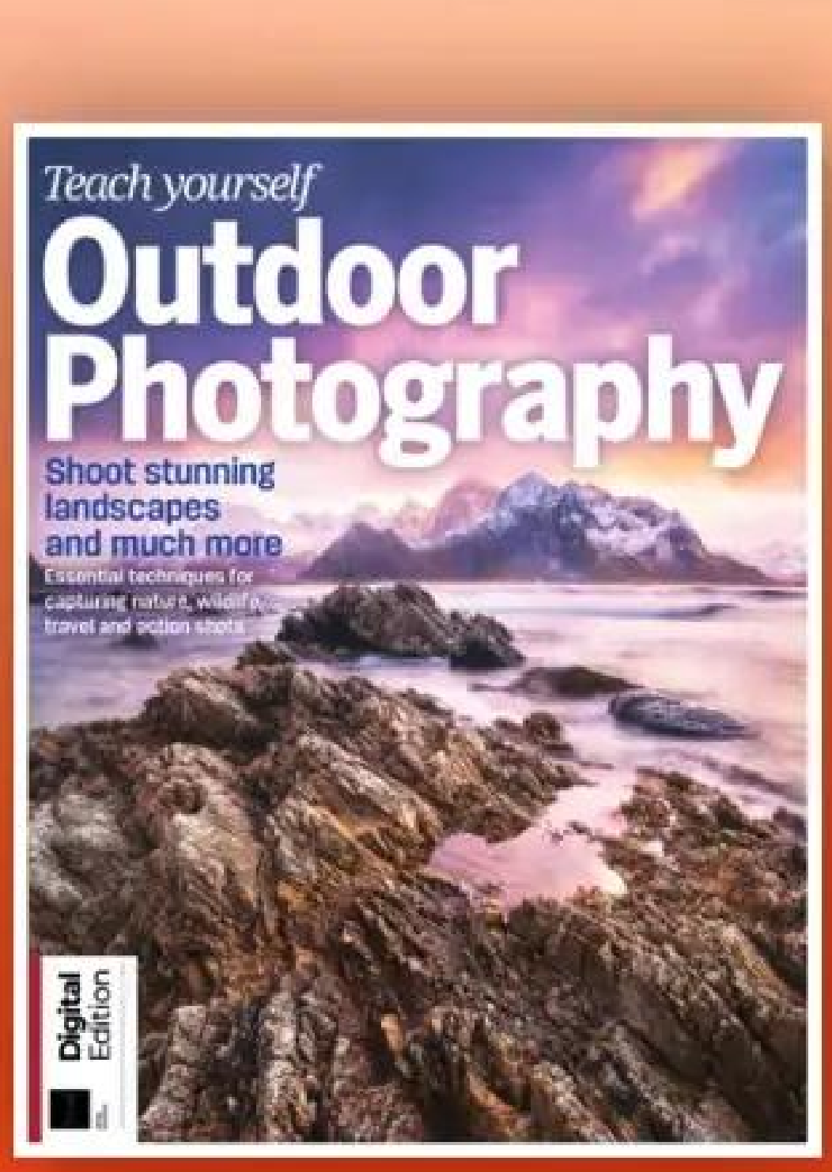
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3
FUJIFILM
S

1

Rugged construction
Weather-sealing at 79 points keeps out dust and moisture, and the camera operates at down to -10°C.

2

Updated grip
Fujifilm has improved upon the X-H1's grip to make it feel more secure with long lenses.

3

Distinctively Fujifilm
While the X-H2S looks every bit a Fujifilm camera, it lacks traditional exposure controls.

Fujifilm X-H2S

£2,499/$2,499

Fujifilm's fastest ever X-series camera raises the game for mirrorless photography. Angela Nicholson takes a closer look

CSC global.fujifilm.com

The Fujifilm X-H2S has been introduced as Fujifilm's flagship X-Series camera and is aimed at sport and wildlife photographers in particular. Although it has the same pixel count as the X-T4, it also features a new 26.1MP APS-C format sensor with a stacked, back-illuminated design. That design is significant because it enables four times faster data readout and this – along with the new X-Processor 5, which is twice as fast as its predecessor – enables the most significant upgrades that the camera makes on the X-H1 (and X-T4).

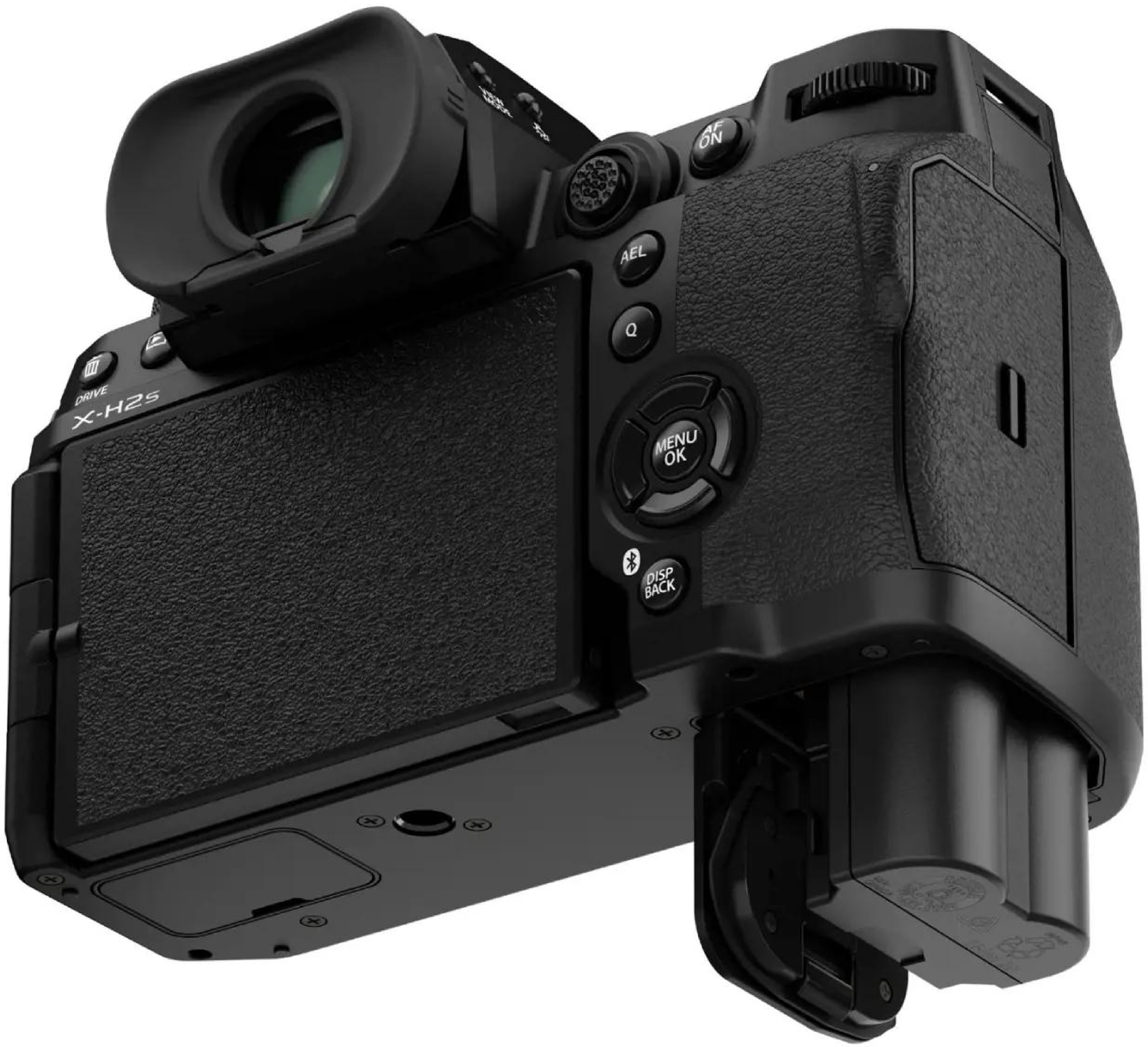
Perhaps the most jaw-dropping statistic associated with the X-H2S is that it has a 40fps (frames per second) full-resolution continuous shooting capability, which comes complete with full autofocus and exposure metering functionality. As you might expect, that blistering rate is only possible when the electronic shutter is selected. The good news here is that the camera does a great job of controlling rolling shutter so it can be used with fast-moving subjects.

If you don't need that kind of speed – and it's unlikely that many photographers will require it often – the rate can be dropped to 30, 20, 15 or 10fps with the electronic shutter and either 15fps or 10fps with the mechanical shutter.

The X-H1 was Fujifilm's first X-series camera to feature in-body image stabilisation (IBIS) and this has been developed further since the first iteration. As well as benefiting from the camera's extra processing power, the new IBIS system in the X-H2S has a better motion sensor and consequently, delivers up to 7-stops of compensation. We got a hit rate of around 60-70 percent in our tests when shooting with the XF 16-55mm f/2.8 R LM WR at 55mm – the equivalent of around 5EV compensation.

When it was launched in 2018, the X-H1 was Fujifilm's most video-centric X-series camera. Things have moved on somewhat since then and the X-H2S makes a raft of upgrades. For instance, 6.2K 29.97p and 4K video can both be recorded internally with 4:2:2 10-bit colour and no crop. 4K video can also be recorded at up to 120p/100p with a 1.29x crop while FHD video can be recorded at 240P/200p with a 1.38x crop, so there are

1
VIEW MODE
SD 2
CF express B 1



"The most jaw-dropping statistic associated with the X-H2S is its 40fps (frames per second) continuous shooting capability"

plenty of options for slow-motion creation. In addition, Apple ProRes 422 HQ, ProRes 422 and ProRes 422 LT are supported. ProRes 422 Proxy is also available when recording ProRes, and raw video can be recorded to an external device.

More good news is that, thanks to the heat-dissipating design of the X-H2S, you should be able to shoot 4K 60p video for around 240 minutes at 25°C before the camera overheats.

Although the X-H2S has the same overall shape as the X-H1, the control arrangement is rather different. The shutter speed and sensitivity (ISO) dials, and the metering, focus mode and drive mode switches of the X-H1 have gone. Instead, there are dual control dials for adjusting exposure and buttons to access the ISO, focus mode and drive mode options. The metering is accessed via the menu (or a custom button) and there's a mode dial on the left side of the top plate with PASM, Filter and video settings, plus seven custom settings.

That extensive array of custom settings means the camera can be set up to suit a range of shooting situations and

Features

Stacked sensor
The X-H2S has the first X-Trans CMOS sensor with a stacked design. This boosts the data readout speed and in combination with the X-Processor 5 delivers the performance enhancements.

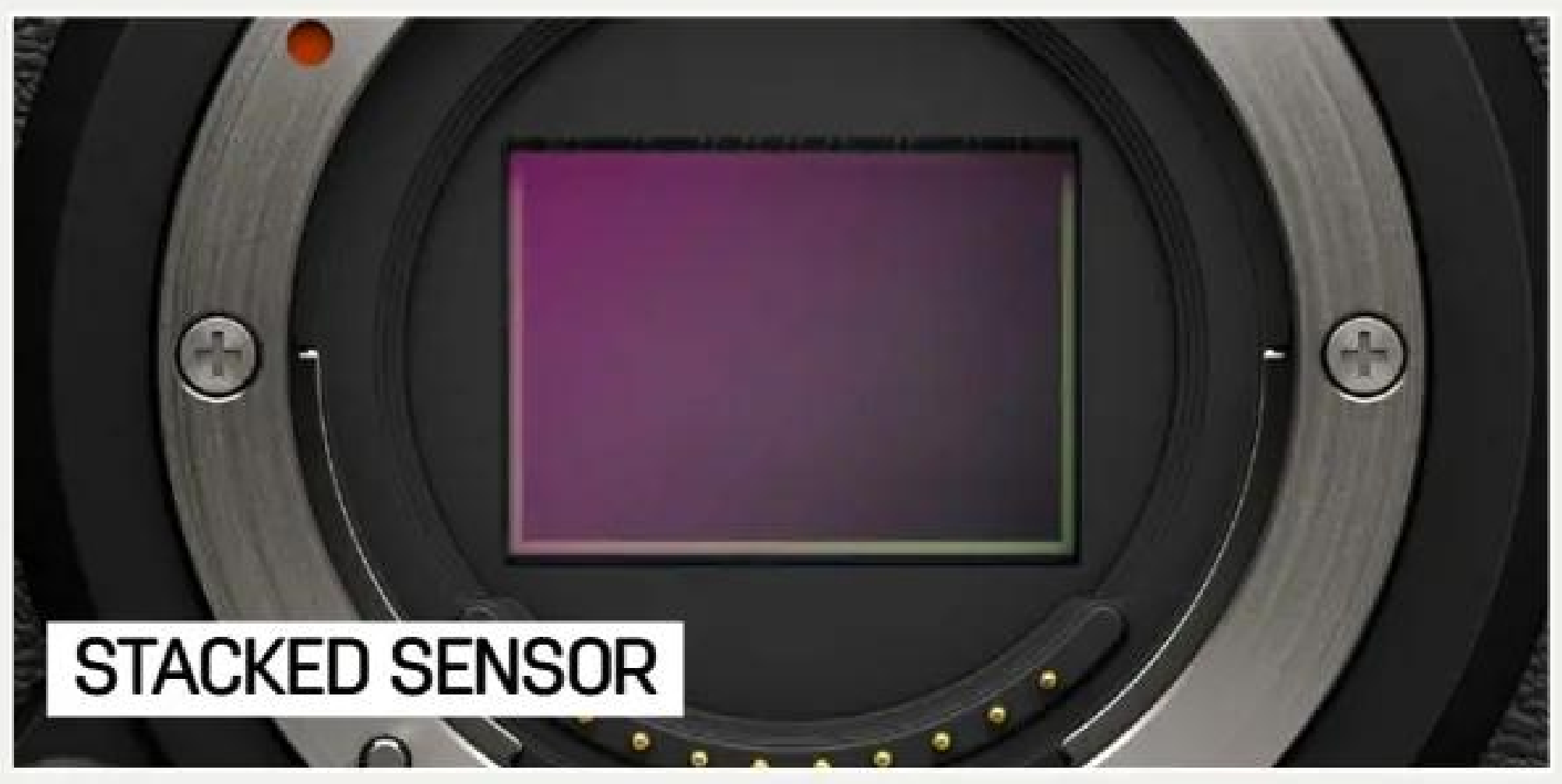
Subject-detection AF
The X-Processor 5 enables subject-detection AF that uses Deep Learning technology. It can track animals, birds, cars, motorcycles, bicycles, aeroplanes and trains, plus human faces and eyes.

New image stabilisation
A new 5-axis stabilisation system in the X-H2S enables up to 7EV of shutter speed compensation depending upon which lens is mounted. It peaks with the Fujinon XF35mmF1.4 R.

High-speed shooting
When the electronic shutter is used, up to 140 uncompressed RAW files, 175 compressed RAW files or 184 JPEGs can be shot at 40 frames per second with full autofocus and exposure function.

6.2K 30p video
Full-sensor 6.2K video can be recorded internally at 30p in 4:2:2 10-bit colour. When shooting 4K 60p video, the 1/180sec sensor readout speed controls the rolling shutter.

New F-Log2
As well as F-Log, the X-H2S features a new F-Log2 profile that expands the dynamic range further to 14 stops allowing a greater scope for post-capture grading.


STACKED SENSOR

GOOD
FESTIVAL
GOODWOOD

a raft of settings may be changed with one turn of the dial. There's also plenty of scope to customise the function of the buttons and dials.

While the handling changes make using the X-H2S a different experience from the X-H1 (and the X-T4), they won't seem dramatic to anyone who is used to shooting with a camera that has an exposure mode dial. All the controls you need are within easy reach, however, there were a few times when I was looking through the viewfinder and pressed the white balance button on the camera's top plate instead of the ISO button. These two buttons feel similar and it would be much easier to distinguish between the two if one of them had a small raised knob on it.

Hold the camera to your eye in a room full of people, and you can instantly tell that the X-H2S's eye-detection function is vastly superior to Fujifilm's previous versions. It's both sensitive and fast and the focusing is also quick. When the 0.5-inch, 5.76-million-dot OLED electronic viewfinder is set to resolution priority, it delivers a detailed view that's perfect if you should ever need to focus manually. Alternatively, the two frame rate priority modes (120fps and 240fps) are better options with moving subjects.

When examining images at 100 percent on a computer screen, noise only starts to become visible at around ISO 1600, however, it is controlled pretty well up to ISO 12,800, which is the standard maximum. Noise is more apparent at the expansion settings, but I'd still be inclined to shoot occasionally at ISO 25,600 if the conditions demanded it. There are a wide range of video options available, but the quality of the 6.2K and 4K footage is particularly impressive.

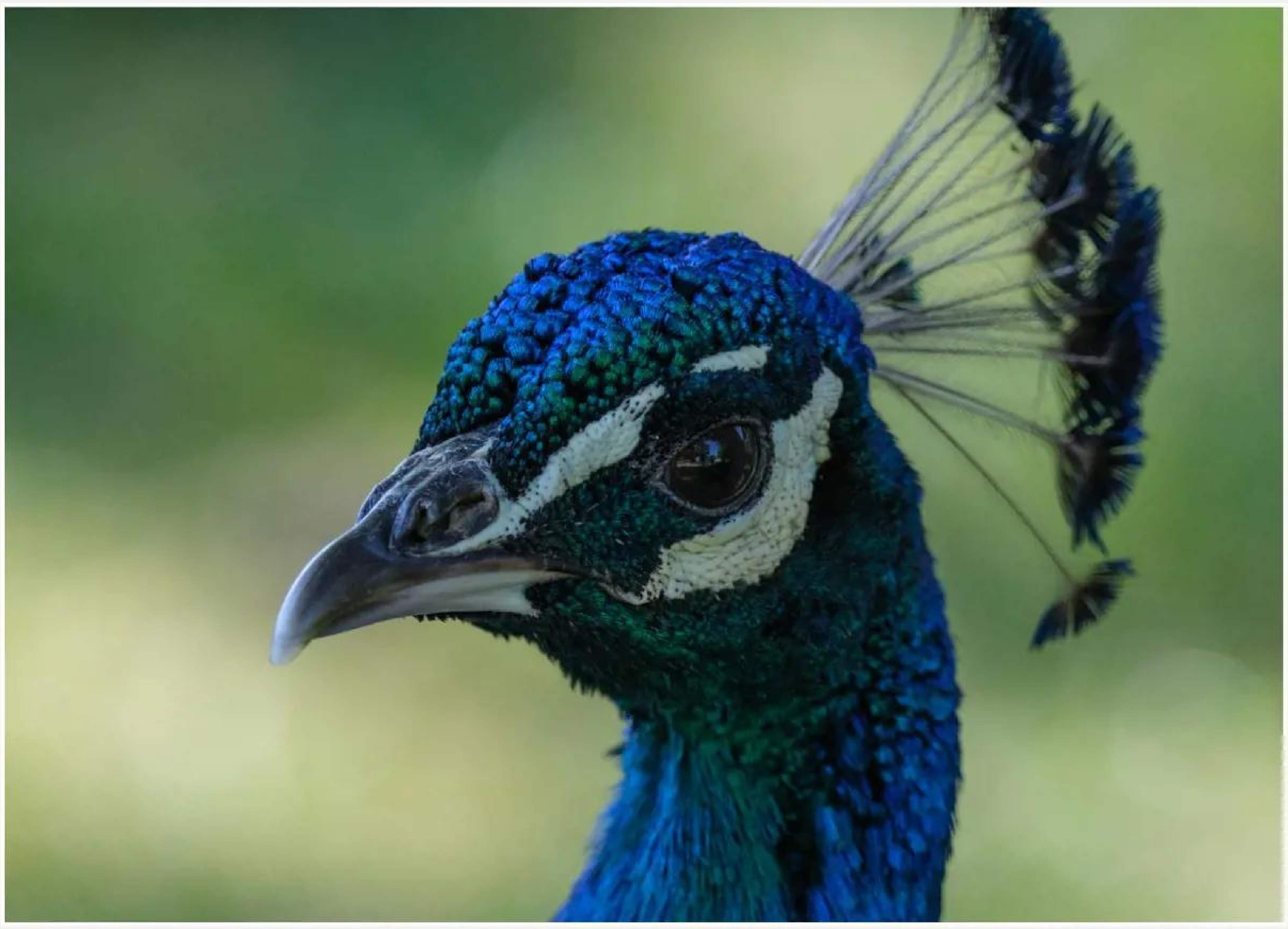
Above Subject detection AF: Subject detection is impressive. Even when it's small, the X-H2S spots the subject. It works best with humans, but also animals, birds and vehicles

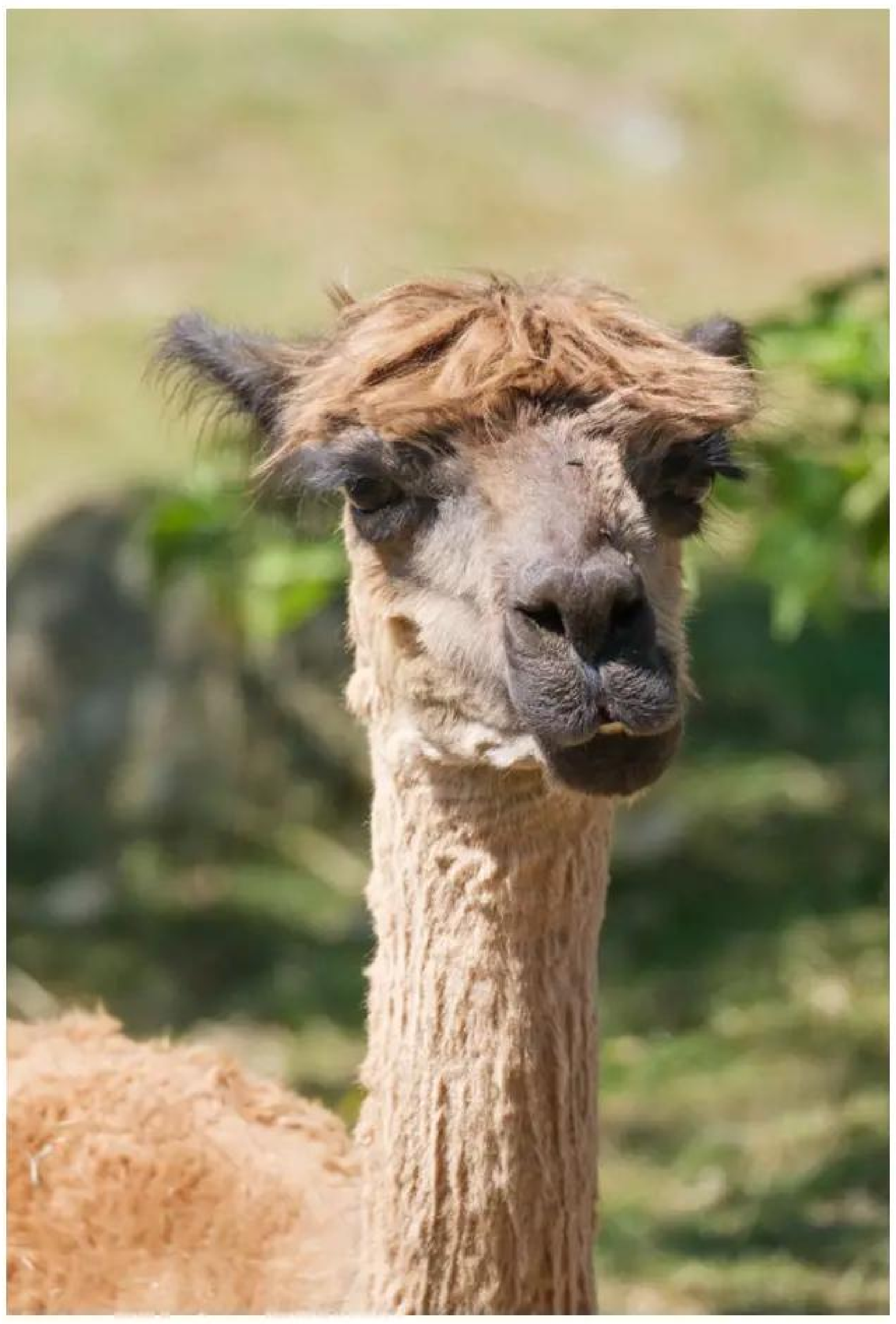
Left Fujifilm colour: Fujifilm's Film Simulation modes deliver great in-camera colour and the Auto White balance system copes well with natural light

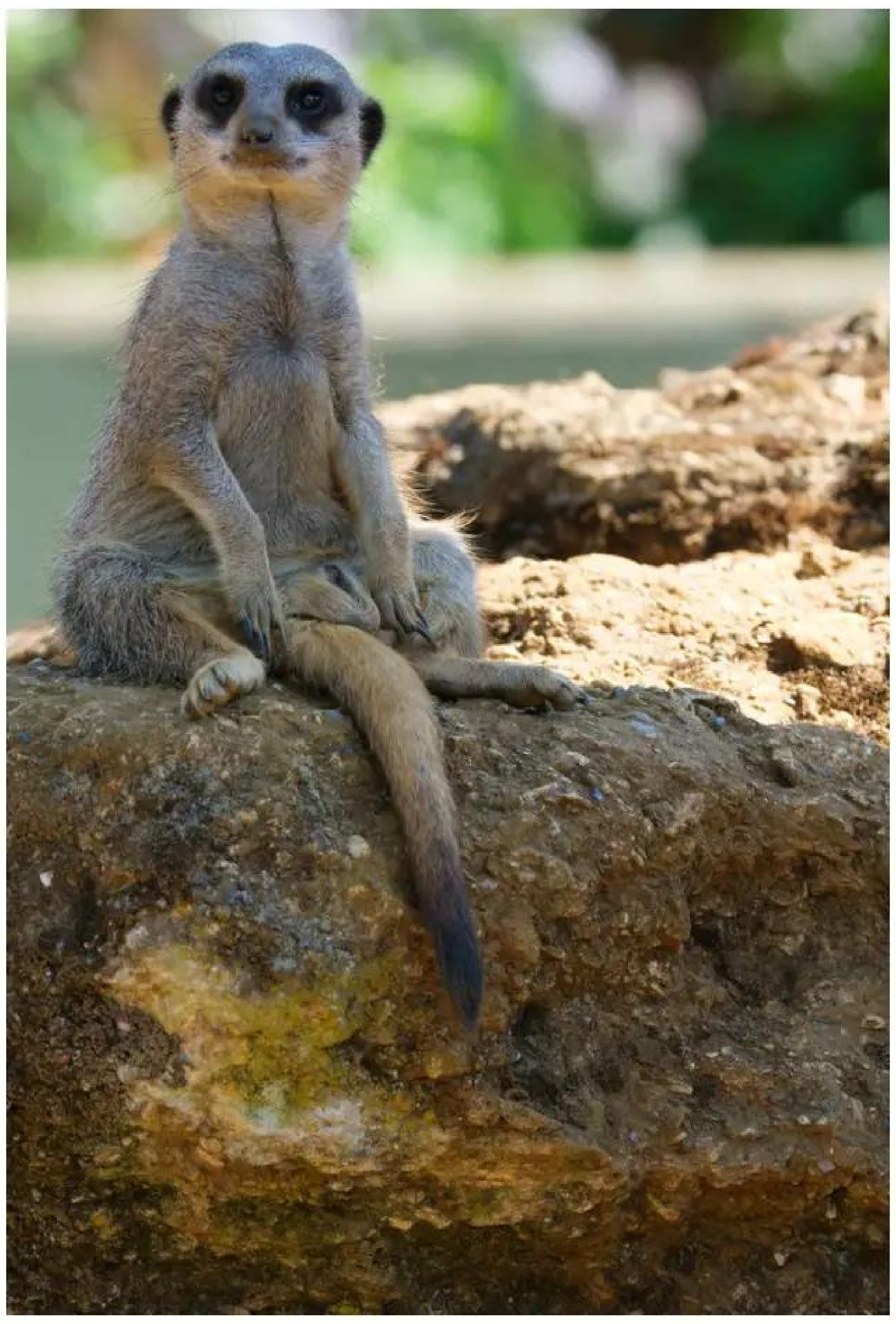
Opposite Excellent noise control: Noise is controlled well throughout the standard sensitivity range with impressive detail at ISO 12,800

Subject detection

The Face/Eye Detection settings and Subject Detection settings are found in the second page of the AF/MF menu and cannot be used together. By default, Function button 1 on the X-H2S's top plate can be used to turn Face/Eye Detection on and off. I customised Function button 2 to turn off Subject Detection. Unfortunately, it's not possible to toggle through the Subject Detection options with a button, so you have to dip into the menu, but it can be assigned to the My Menu screen. Strangely, if multiple subjects or eyes are seen in a frame, you can't use the joystick to jump to a different one for focusing. Instead you either have to move the camera so that the detection box is over the subject you want to focus on, or tap on the desired subject on the main screen. The various subject detection modes work well, but it's apparent that the wide variety of body and face shapes in animals means they present more of a challenge than humans do.







FUJIFILM X-H2S

Megapixels (effective)	26.16
Max resolution	6240 x 4160
Sensor information	APS-C X-Trans CMOS 5 HS
Shutter speed	Mechanical: 15min to 1/8000 sec plus Bulb to 60min, Electronic: 15min to 1/32,000 sec plus Bulb: 1 sec fixed
ISO sensitivity	ISO 160-12,800 expandable to ISO 80-51,200 (stills), ISO 160-25,600 (video)
Exposure modes	Program, Aperture priority, Shutter priority, Manual
Metering options	Multi, Spot, Average, Centre Weighted
Flash modes	External - TTL (TTL Auto, Standard, Slow Sync), Manual, Multi, off
Connectivity	Wi-Fi, Bluetooth, USB-C, HDMI (Type A), 3.5mm mic, 3.5mm headphone, 2.5mm remote release, sync
Weight	660g including battery and memory card
Dimensions	136.3 x 92.9 x 84.6mm
Batteries	Li-ion NP-W235S
Storage	SD UHS-II and CFexpress Type B
LCD	3.0-inch 1.62-million-dot vari-angle touch screen
Viewfinder:	0.5-inch 5.76-million-dot OLED

FEATURES
There's a terrific array of features but the subject-detection AF stands out for its everyday benefits

★★★★★

BUILD QUALITY
The Fujifilm X-H2S feels robust, has extensive weather-sealing and is comfortable to hold

★★★★★

HANDLING
Some may bemoan the loss of the traditional controls, but the X-H2S handles well with everything in reach

★★★★☆

QUALITY OF RESULTS
Its 26MP APS-C format sensor extracts lots of detail and colours are the usual Fujifilm standard

★★★★★

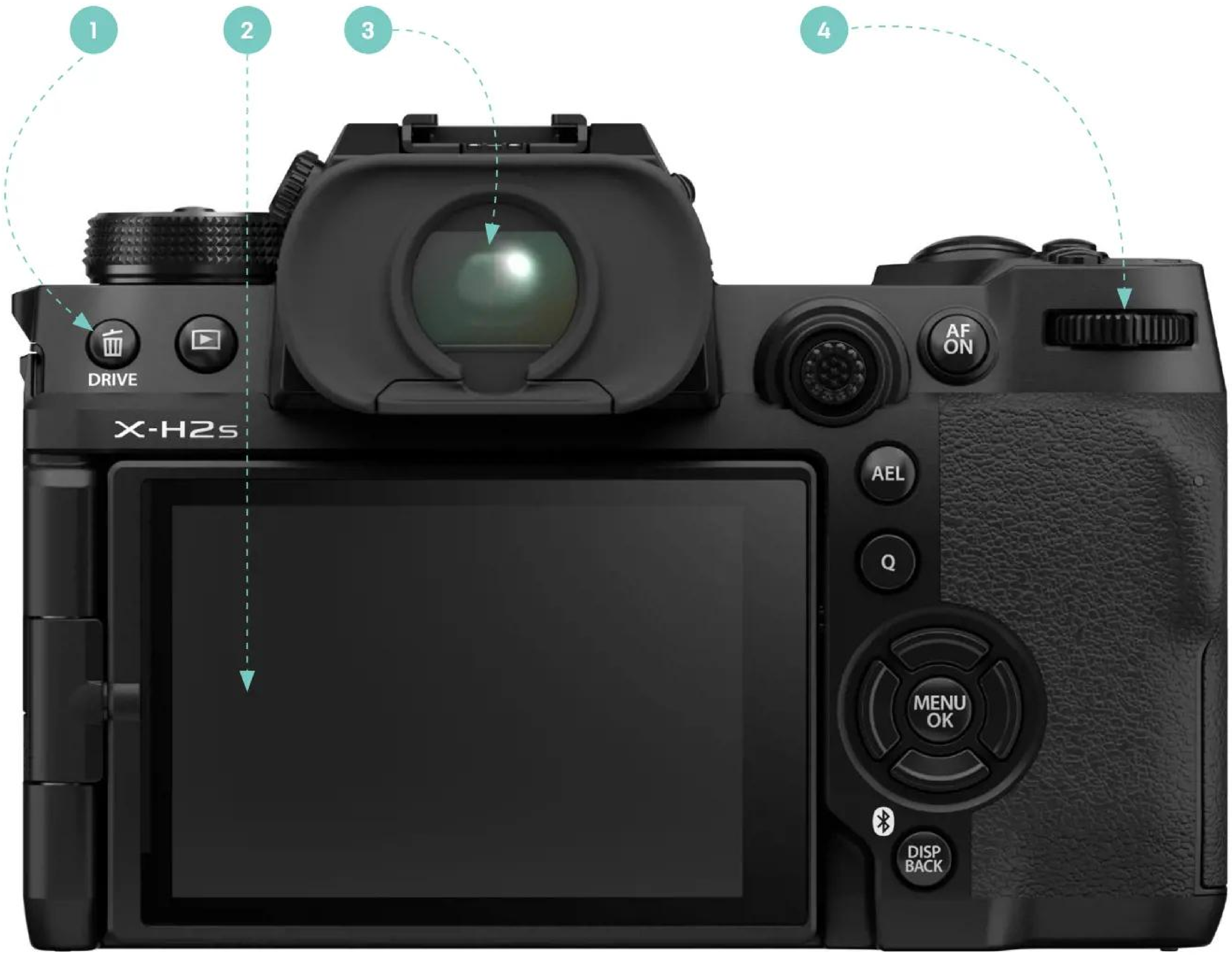
VALUE FOR MONEY
Using a stacked sensor increases the price but the flagship X-H2S also offers a solid set of features

★★★★☆

Overall
The X-H2S is a big step up from what we have seen from Fujifilm, not least with the autofocus system. It is a truly impressive camera

★★★★★

> *"The X-H2S's eye-detection function is both sensitive and fast – and vastly superior to Fujifilm's previous versions"*



① **Drive button**
Instead of using a drive dial, the drive mode options are accessed by pressing a button.

② **Viewfinder settings**
The resolution and refresh rate settings can be adjusted via the down navigation button.

③ **Vari-angle screen**
The screen can be flipped out to face forwards and angled, but it will snag on a headphone cable.

④ **Dual control dials**
While the X-H2S has dual control dials, the lens ring can be used to set the aperture value.

CSC www.sony.co.uk

Sony a6700

£1,449/$1,398

Sony is back with a new crop frame champion to try to reclaim the APS-C format throne. We put it through its paces

Features

APS-C format sensor
The Sony a6700 features a crop-frame sensor that applies an approximate 1.5x magnification to the effective focal length.

BIONZ XR processor
The latest BIONZ processing engine allows the a6700 top continuous shooting speed of 11 frames per second at full resolution, for 59 RAW files or 1000 jpegs.

Battery
For convenience, the a6700 uses the same rechargeable Lithium-ion NP-FZ100 battery pack as the a6600. This offers a CIPA-rated 550 shot capacity.

ISO range
Thanks to the latest Exmor R sensor, the Sony a6700 offers a top ISO setting of 32,000 in the native range and up to 102,400 in the expanded settings. This can be extended down to 100 or 80 in native and expanded respectively.

Video features
Along with HEIF and Log modes, the a6700 can shoot 4K up to 60p or 4K at 120p in a 1.58x crop mode. 4K streaming is possible at 30p.

Articulated LCD
As an upgrade to the a6600's LCD, the unit on the a6700 is a fully articulated vari-angle model, allowing shooting at awkward angles and useful for shooting self-portraits or vlogging.

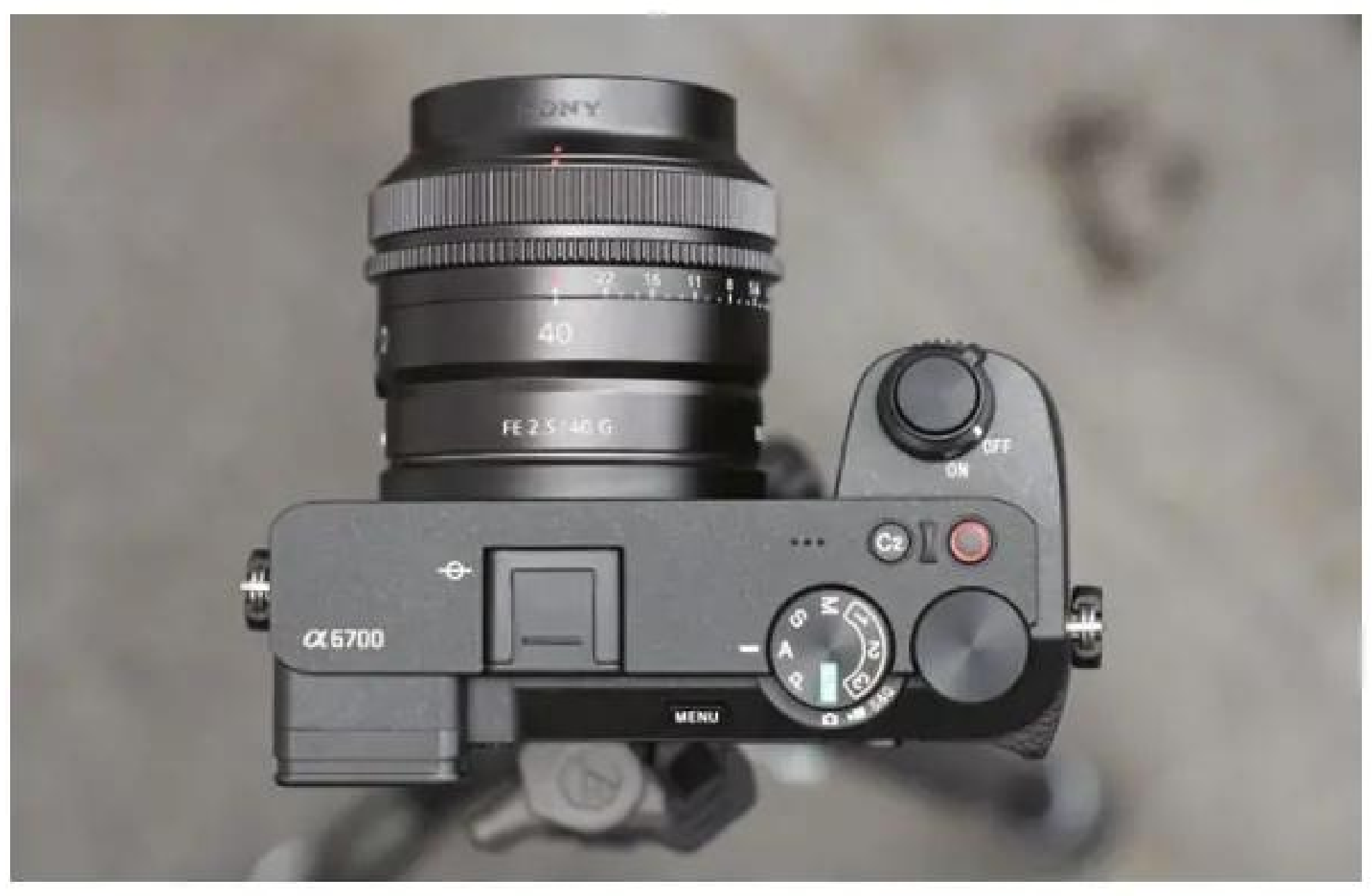
Sony hit on something great when it released its first APS-C crop sensor mirrorless camera way back in 2013, combining the new and exciting Sony E-Mount that offered smaller and lighter mirrorless lenses with a light and compact camera body that could easily be slipped into a bag. Sony's a6x00 range of cameras became wildly successful with travellers, weekend photographers and content creators as the compact hybrid camera to beat.

The Sony a6600 has been at the top of Sony's range since 2019, however over the past few years, Sony has made a lot of technical developments that the company is rapidly rolling out to new camera models. This has meant that fans of Sony's a6x00 range have been clamouring for Sony to update its lineup. Now Sony has answered those calls with the latest incarnation, the Sony a6700.

The a6700 features a 26-megapixel APS-C back-side illuminated (BSI) CMOS sensor from Sony's Exmor R range, capable of ISO 100-32,000 (80-102,400 extended) and supported by 5-axis in-body image stabilisation (IBIS) that offers up to five stops of shake correction. When compared with the 40MP sensor in the Fujifilm X-T5 or the 64MP sensor in Sony's own A7R V, this might look a little tame, however 26MP still competes with rival cameras at this price point and is more than enough resolution to use across the web and social media, and should also be fine for medium-sized prints.

Details from the a6700 are excellent, Sony's cameras exhibit some of the most clinically sharp images available and the a6700 is no exception. You might prefer a little more softness to your images than Sony's default profile, but that will be down to personal preference and the type of work you create. Colours are accurate, but they have a richness and vibrancy that make them pop without looking unnatural. The a6700 managed to produce an accurate and, importantly, consistent white balance between photos, even in changeable weather and lighting. We also really like the skin tones that Sony cameras produce, veering towards slightly warmer tones and increased saturation that makes subjects look more healthy and vibrant.

Trickling down from Sony's high-end A7R V, the a6700 also uses the combination of Sony's latest Bionz XR processor and separate AI chip for autofocus and image processing, allowing for speeds of 11 frames per second with a buffer of 1000 jpegs or 59 RAW photos at full resolution with continuous autofocus. You can expect the autofocus to be incredibly fast and accurate. For static subjects, the a6700 locked onto targets at blink-and-



Right
Despite the compact form, Sony has managed to integrate a deep handgrip. Disappointingly, there is only a single SD card slot.

you'll-miss-it speed and, at this point, it is hard to see how standard point autofocus can get perceptively faster. Where the a6700 now shines is in its AI recognition and tracking capabilities for humans as well as various animals, birds, vehicles and also insects. Unfortunately, we couldn't find an abundance of insects but can confirm that the animal and bird tracking works to perfection on the limited range of animals we could find. The camera even tracked some foxes skulking around in near-darkness. Sony's human and face tracking is some of the best available – the a6700 can recognise human bodies and heads, as well as faces and eyes. The camera had no issues tracking our subject around the frame, keeping the eyes in focus in every shot – even deliberate erratic movements couldn't throw the focus off. We also got an impressive hit rate for burst shooting for full subjects, although it couldn't nail focus on small details like eyes in every shot, it still impressed us with how many usable shots there were.

With Sony's focus on video, it should be no surprise that the video performance on the a6700 is excellent. The 4K video is impressively sharp, rich and detailed in standard outputs and, if you have no intention of digging into codecs or LUTs, then you don't need to as the standard footage from the a6700 is definitely good enough until you want to get really creative. The Sony a6700 keeps the compact build that is a hallmark of the series. The grip on the a6700 is surprisingly deep and moulded for what is quite a compact camera, and it is comfortable to carry and use one-handed. Possibly our favourite improvement on the a6700 from the previous generation is the screen. The a6700 now has a fully articulated vari-angle screen instead of the a6600's awkward flip-up one.

The hottest competition for the new Sony a6700 comes from Fujifilm, which has gone all-in on the APS-C format. The Fujifilm X-S20 is one of the best all-around hybrid cameras you can buy right now, with a similar sensor for stills to the one used by Sony in the a6700, but it goes even further for video with 6.2K open-gate footage. The X-S20 has a more traditional SLR design and it is cheaper than the a6700, which will also sit well with more traditional photographers.

The Sony a6700 is a logical step forward from its predecessor, the a6600. While it doesn't reinvent the wheel, still offering a compact rangefinder-style APS-C camera, some design refinements and leaps forward in technology make this a compelling upgrade.

SONY A6700

Megapixels	26MP
Max resolution	6192 x 4128
Sensor	APS-C BSI-CMOS (23 x 15.5mm)
Shutter speed	30sec – 1/8000sec
ISO sensitivity	50 - 102,400 (Expanded)
Drive speed	11fps
Video resolution	4K (3840 x 2160)
Metering options	Center-Weighted, Multi, Highlight-weighted, Average, Spot
Connectivity	USB3.2 Gen 2, Micro HDMI, Wifi, remote, microphone, headphone
Storage	1x SD/SDHC / SDXC UHS-II
LCD	3inch, 1,036,800 Dot fully articulated touch-sensitive TFT
Viewfinder	2,360,000 Dot XGA EVF
Weight	493g (inc. battery)
Dimension	122 x 69 x 64mm

FEATURES
There is plenty here for enthusiasts in both stills and video. A significant upgrade

★★★★½

BUILD QUALITY
Tough but portable, the a6700 is kitted out to deal with everyday shooting

★★★★★

HANDLING
The deep handgrip is surprising and welcome for such a small body

★★★★★

QUALITY OF RESULTS
The stills have plenty of detail despite the low resolution, and the video quality is top-notch

★★★★½

VALUE FOR MONEY
There are cheaper options, and a better viewfinder would be nice. Reasonable value

★★★★☆

Overall
The Sony A6700 is one of the best camera options for hybrid travel photographers or content creators who crave professional features for still images and videography.

★★★★½

> *"The Sony a6700 is a logical step forward from the a6600. Design refinements make this a compelling upgrade"*

Above
The a6700 retains the small form factor of the a6600, which is great for travel shooters. As an upgrade to the a6600, the a6700 recieves a fully articulated 3in rear LCD.

FUJIFILM
X-T30
FUJINON ASPHERICAL LENS
SUPER EBC XC 15-45mm 1:3.5-5.6 OIS PZ Ø52
M C S

CSC www.fujifilm-x.com

Fujifilm X-T30 II

£770/$899

Fujifilm's 'little giant' has been given an upgrade in the form of the X-T30 II, Angela Nicholson investigates

Fujifilm's X-T30 is one of my favourite cameras of recent times because it combines a solid build, traditional controls and a relatively compact body with the ability to produce attractive images that have excellent colour and exposure, plus a good level of detail. So it's with mixed emotions that I discover that the X-T30 II only makes a few upgrades on its predecessor, most of which, some might argue, could have been implemented with a simple firmware update to the X-T30. But let's focus on what the new camera offers.

First up, I have no qualms about the sensor and processing engine, they are the same 26.1MP X-Trans CMOS 4 sensor and X-Processor 4 as in the X-T4 and X-T30. That's a great combination and it delivers the image quality that both I and many other photographers like.

The X-T30 II only has a few physical upgrades on the X-T30, one of which is a move from a 1.04-million dot screen on its rear to a 1.62-million dot device. That simply means that when viewing your images, they look even crisper than before. The rest of the upgrades are on the inside of the X-T30 II, for example, it has the enhanced autofocus (AF) algorithms of the X-T4 to make its Intelligent Hybrid AF system faster and more sensitive in low light than the X-T30. In fact, when the Fujifilm XF50mm f1.0 R WR lens is mounted, the X-T30 II's AF system is sensitive down to -7.0EV rather than -3EV with the X-T30.

This was particularly noticeable when shooting on an overcast winter day in a local woodland. Even in the low contrast and poor lighting conditions, the X-T30 II managed to get the subject sharp quickly and decisively. It also does a good job of

Fujifilm X mount

Fujifilm has one of the best mirrorless lens ranges available for its X-mount cameras

Fujifilm currently lists 21 X-mount prime lenses on its website, with focal lengths running from 14mm (XF 14mm F2.8 R) to 200mm (XF 200mm F2 R LM OIS WR) and including the superb XF 50mm F1.0 R WR. There are also 13 zoom lenses, covering a focal length range of 8mm (XF 8-16mm F2.8 R LM WR) to 400mm (XF 100-400mm F4.5-5.6 R LM OIS WR), plus 1.4x and 2x teleconverters.

Taking the 1.5x focal length magnification factor into account, this makes the overall available focal length range 12mm to 600m, or 1200mm with the 2x teleconverter. There are optics available for every genre of photography, but the X-T30 II is arguably best suited to street, travel and landscape photography.

FUJIFILM
X-T30

keeping moving subjects sharp when the AF area is kept over the right point. In addition, the Face/Eye detection is more reliable, but it still only works with human faces and eyes.

Shooting moving subjects often calls for high continuous shooting rates and the X-T30 II can shoot up to 53 full-resolution JPEGs or 17 RAW files at 20fps (frames per second) when the electronic shutter is in use.

If that's not fast enough, you can switch to 30fps but incur a 1.25x crop and capture 16MP images. Alternatively, shooting with the mechanical shutter gives a maximum rate of 8fps for up to 90 JPEGs or 18 RAW files.

Fujifilm has given the X-T30 II the Classic Neg and Eterna Bleach Bypass Film simulation modes in addition to the 16 of the X-T30. There are also controls to adjust the Clarity, Tone Curve and Monochromatic Color, plus the Auto White Balance can be set to White Priority or Ambience Priority and the Color Chrome FX Blue option has been introduced to subtly enhance blue subjects.

On the video front, aside from the addition of Film Simulation modes, the only upgrade brought by the X-T30 II is that it can shoot 4K video for up to 30 minutes instead of just 20 on the previous model. Like the X-T30, the new camera can record 4K video in 17:9 or 16:9 aspect ratio, capturing in 6K at up to 30p and downsampling to 4K (4096x2160 or 3840x2160 respectively) for better quality.

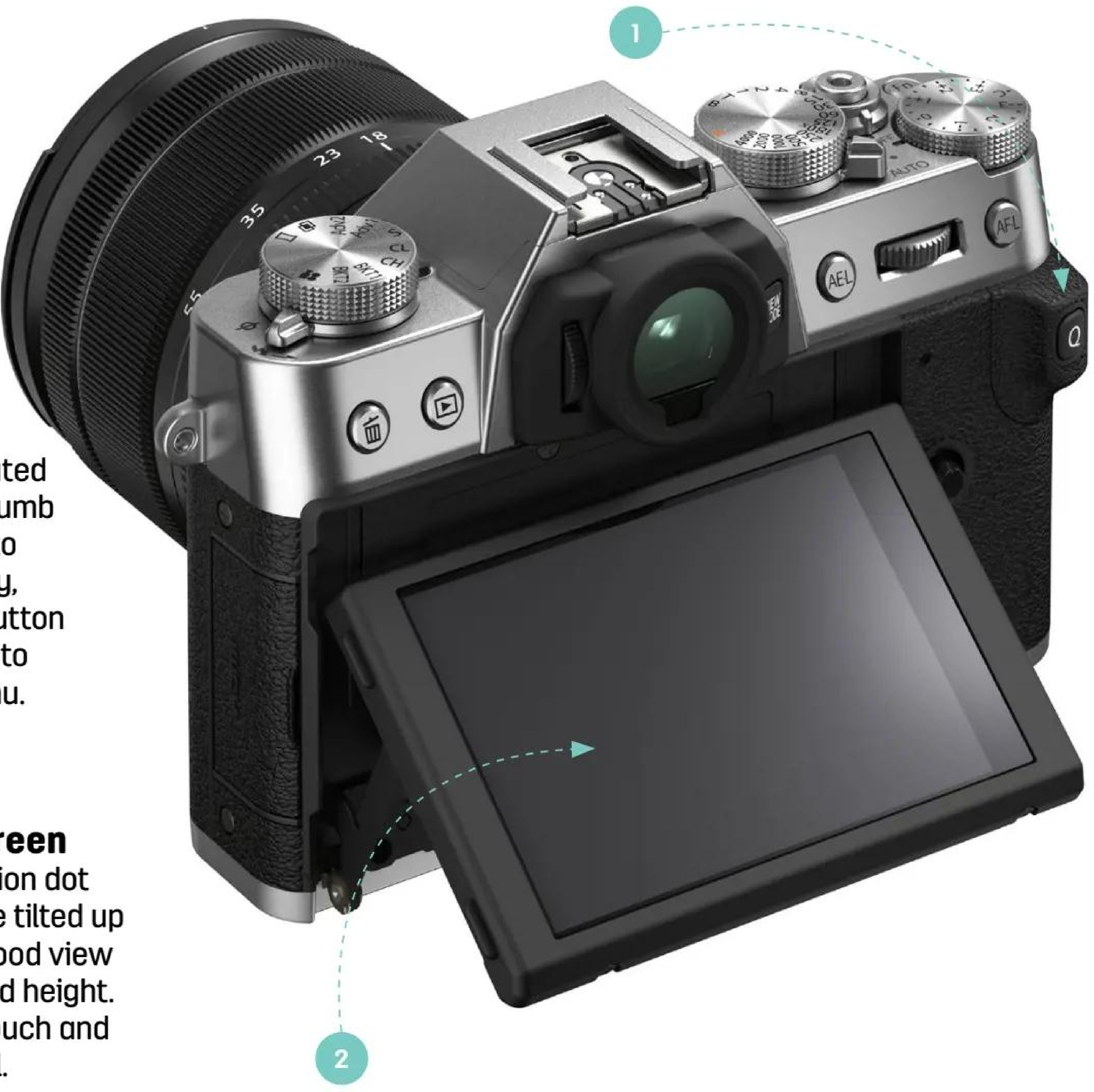
Full HD footage can be recorded at up to 120p for slow-motion playback. There's also F-Log recording and the ability to record to an external device via HDMI cable to capture 4:2:2 10-bit colour, rather than the 4:2:0 8-bit colour that's recorded to an SD card.

Although it's not weather-sealed, the X-T30 II's top and bottom plates are made from magnesium alloy, while its dials are made from aluminium alloy, giving it a durable feel. The grip is also nicely shaped and while the camera feels best when paired with a smaller lens, it's okay with longer lenses too.

Like the touchscreen, the 0.39-inch, 2.36-million dot OLED viewfinder gives a reasonable preview of the image, showing plenty of detail and matching the colour and exposure of the captured shot.

My only complaint regarding the control layout is that the Q button used to access the Quick menu is too easily pressed accidentally.

This function can be turned off and assigned to another button instead, but it would have been nice to see this button located in a more practical position on the new camera.



1

Q Button
The Q button is located on the top of the thumb ridge and it's easy to press it accidentally, however another button can be customised to open the Quick Menu.

2

Tilting touchscreen
The 3-inch, 1.62-million dot touchscreen can be tilted up or down to give a good view above or below head height. It's responsive to touch and has gesture control.

Above Snappy focusing: The Intelligent Hybrid AF system, with up to 425 selectable points, captures sharp moving subjects, even in low-light conditions

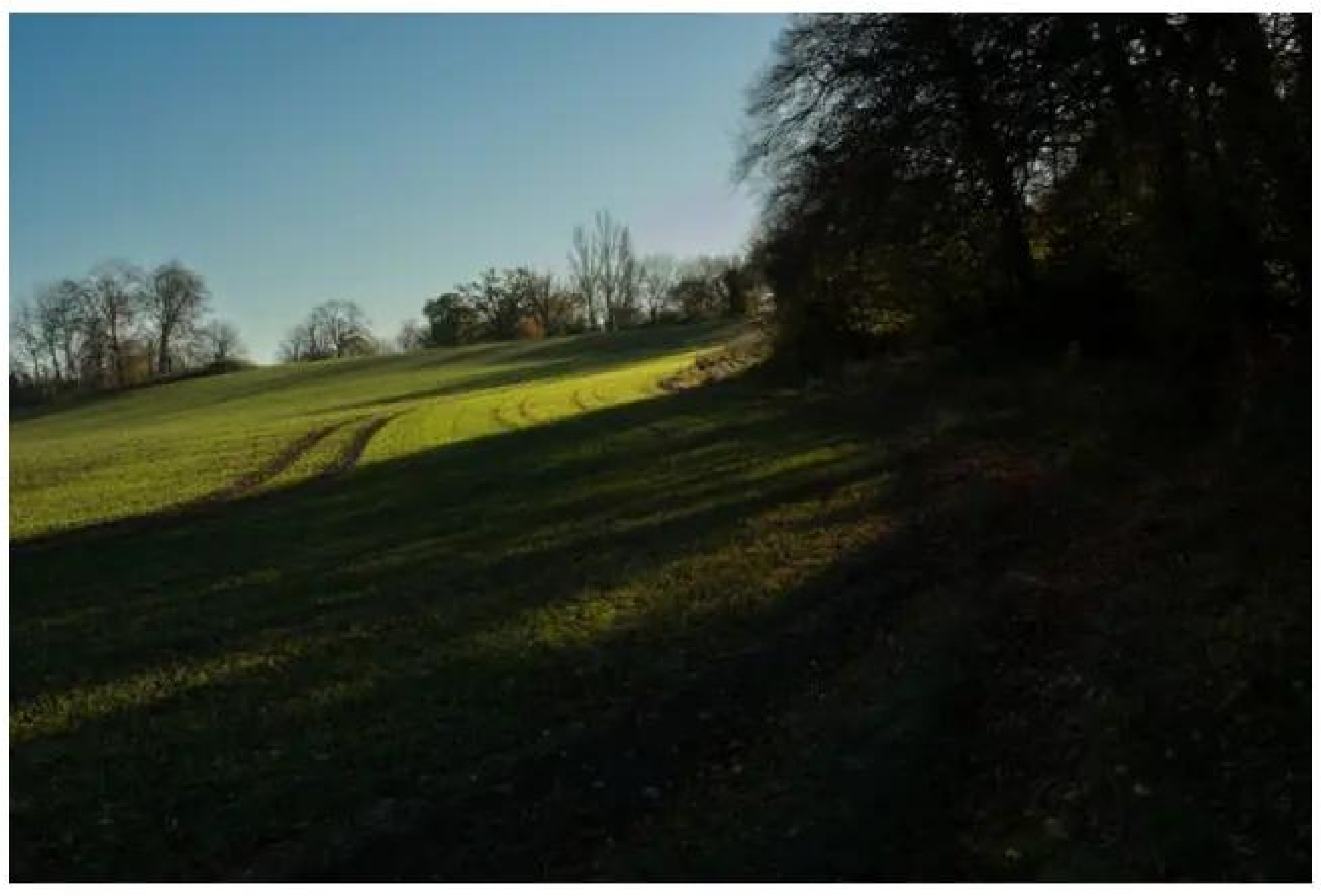
Below Dynamic range: Fujifilm's 26.1MP X-Trans CMOS 4 sensor has good dynamic range, so highlights don't burn out and shadow detail is often recoverable

Summary

Ease of use	★★★★☆
Value for money	★★★★☆
Features	★★★★☆
Quality of results	★★★★★

Overall ★★★★⯪

Although this model isn't really a huge upgrade on the X-T30, there are some noticeable improvements to an already good camera. That makes the X-T30 II a winner for travel and everyday photography



All images © Angela Nicholson

1 The Leica SL3-S shares the sturdy, pared-back design of the previous iteration, the SL2-S.

2 The black branding, here preferred to the white of the SL2, will be ideal for working subtly.

3 The mirrorless L-Mount allows Panasonic and Sigma lenses to be used alongside Leica's.

Leica SL3-S

£4,500/$5,295 (body only)

Leica's fastest ever camera could also be its best mirrorless

CSC www.leica-camera.com

SPECIFICATIONS

Lens mount: L-Mount
Sensor: 24.6MP full frame BSI CMOS
Autofocus: Hybrid: 315 contrast-AF points. 779 phase-detection AF points
ISO range: 50-200,000. Dual Basis Low 50-560. Dual Basis High 640-200,000
Image stabilisation: 5-axis, 5 stops
Max burst: 30fps with AF
Max video resolution: 6K 30p open gate / C6K / 6K (10-bit, 4:2:0), C4K / 4K (10-bit, 4:2:2), Full HD 120p (10-bit, 4:2:2)
SSD recording: Yes
Viewfinder: Electronic, 5.76 million dots, 120fps refresh
LCD: 3.2-inch, 2.33 million dots
Memory cards: 1x CFexpress Type B, 1x SD UHS-II
Connectivity: HDMI, headphone jack, microphone jack, timecode, USB-C, Wi-Fi, Bluetooth 5.0
Dimensions: 151.45 x 108.05 x 84.6mm
Weight: 768g (body only)

If you're going to moan about the price of the Leica SL3-S, you should probably stop reading here. Cameras are expensive, luxury cameras even more so. And while the Leica SL3-S is a luxury camera, it's also a pretty special one.

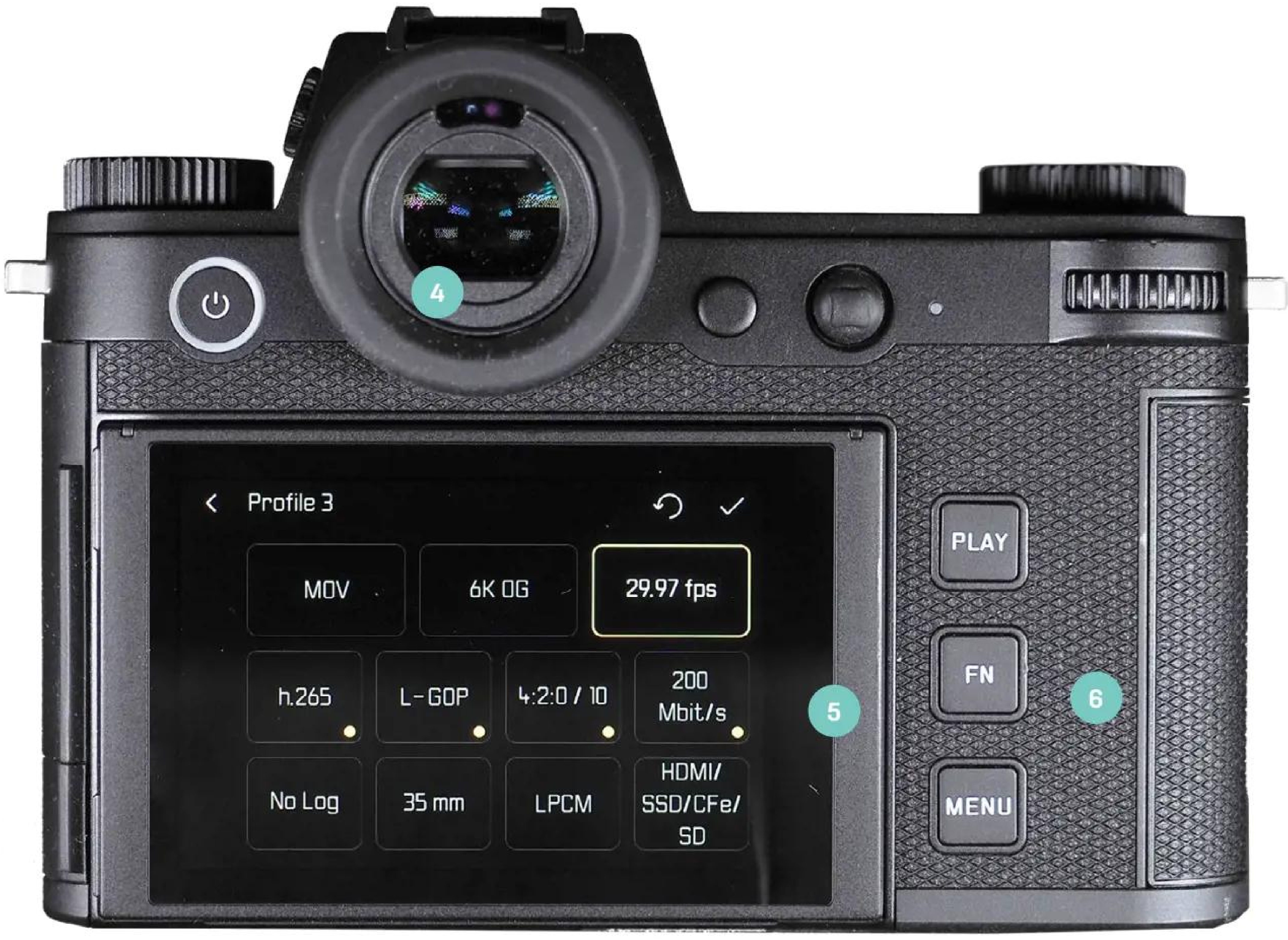
Of course, similar technology is available elsewhere – but it isn't a Leica. It doesn't look this good, it doesn't feel this good and, in some respects, the technology isn't this good either. The Leica SL3-S is officially 'the fastest Leica system camera ever built' but it might just be the best mirrorless camera Leica has ever developed – and a much more versatile performer than 2024's 60MP, 8K Leica SL3.

The Leica SL3-S is available now with a retail price of £4,500 ($5,295), which is, unquestionably, an enormous amount of money. But once again, Leica is a luxury brand and the cameras are hand-assembled in Germany.

For some perspective though, the Panasonic Lumix S5 IIX shares the same core technology as the SL3-S – and is currently available for £1,999 ($2,199). Purely in terms of technology, the Lumix offers like-for-like shooting performance at a far more affordable price. However, the Leica's shooting experience is a very different one – as are the ergonomics, interface and prestige. Only you can decide whether that is worth the difference in price.

Build and handling

Having been lucky enough to have visited the Leica factory in Wetzlar, Germany, to see these cameras being assembled by hand, I can vouch for the level of craftsmanship that is at the heart of the red dot experience. Like its siblings, the Leica SL3-S is an artisan product that oozes quality. The lines and silhouette may not be to everyone's taste but there's no denying that this is a beautifully designed camera. I'm a fan of



4
With 5.76 million dots and 0.78x magnification, the SL3-S's viewfinder is bright, clear and sharp.

5
The SL3-S's rear display can tilt, but can't be flipped forward to be used as a video monitor.

6
A simple, stripped-back rear panel doesn't offer buttons and controls where none are needed.

7
A pair of control wheels bookend the top plate of the SL3-S and have a reassuring action.

8
A status panel on the top plate and the tilting LCD will make shooting from the hip a breeze.

9
Card storage on the SL3-S is provided by a CFexpress Type B plus a UHS-II SD.

35
F 2.0
1/2000
400
0
7
8
9

the sleek black Leica logo on the viewfinder hump, rather than the white lettering of the SL3.

Likewise, while there are other cameras with more pleasing ergonomics, no one would dispute that this camera just feels good in the hand. It has weight and heft, the way you imagine a bar of gold bullion might.

The body is identical to the SL3 in dimension, the only outward difference being the black logo. As such, it retains the design hallmarks – including the minimalist aesthetic, with only three of its numerous buttons and dials being labelled (in part because Leica wants every camera to be unique, customised to its user's requirements).

The three control dials are very satisfying to use, placed exactly where your thumb and forefinger expect them to be, and the rear joystick is fast and accurate, enabling you to breeze through menus or manipulate your focus points quickly and easily.

A feature that shouldn't be overlooked is the camera's IP54 certification (again like the SL3), meaning that it's protected from dust ingress and water splashing from any direction. I took this camera out to shoot in the rain as Storm Eowyn battered the British Isles, and the camera shook it off like it was nothing.

Still, maintaining the design of the SL3 means carrying over some less-than-loved features, among them the tilt-only screen, rather than a fully articulating affair. In fairness, being largely traditional photographers, Leica shooters may be more inclined to a tilting screen than a flip-out one. That said, for a camera that leans so heavily into video, not having that articulation makes it feel strangely user-unfriendly.

The other red flag to some users is the illuminated power button. The button is surrounded by a white ring that changes colour depending on the situation. When powered up, the light is a gentle white; when the battery is low or expired, it's red; when charging, it's green. I like the feature, but others feel that it cheapens the premium aesthetic.

Performance

The shooting experience of the Leica SL3-S is absolutely exquisite. Cynics will say this doesn't count for much, but it does. Can anyone honestly say that the experience of shooting on an iPhone is in any way satisfying, let alone inspiring or aspirational? I don't think so. Shooting on the SL3-S is simply a joy. This is a camera that is truly pleasurable to use, with a friction-free interface that connects your vision to your shutter finger in an intangible, incredible way.

This is where Leica and Hasselblad just blow everyone away: the way the camera just gets out of your way. Both brands have seamless, instinctive, Apple-like menus and controls; you don't find yourself wrestling with settings or lost in endless screens trying to change something. The SL3's menus are sleek, slick and smooth.

Connect the camera to your phone and you'll be able to download Leica Looks, which offers a similar experience to filters and film simulations on other cameras. But it's hard to beat the purity of the in-body black-and-white modes, which feel like the way the SL3 was intended to shoot.

After the burst limitations of the SL3, I was happy to have the ability to shoot at 30fps (with full autofocus) on the SL3-S. I struggle to see anyone using this on the sidelines of a sports event or in the dirt photographing wildlife, but this camera can largely do those things if you want it to – though you should be aware of the aggressive rolling shutter.

The 'largely' part relates to the autofocus system on the SL3-S, which like its big brother, is a little on the slow side when compared to other AF systems – including the phase detect AF on the Lumix S5 IIX. It's not bad, but it definitely lags behind the pack – though again, I don't think this is a camera that anyone is going to expect to use for lightning-fast action.

The best way I can describe it is that the SL3's autofocus is reactive,

→

Above: Leica SL3-S and Leica Summilux SL 50mm f/1.4 ASPH (1/30 sec at f/1.4, ISO 200)
Below: Leica SL3-S and Leica Summilux SL 50mm f/1.4 ASPH (1/30 sec at f/1.4, ISO 64)

rather than proactive in the way that Canon or Sony's are. It finds faces and eyes on people as well as animals and it tracks things when you ask it to – it just takes a split second longer and isn't as predictive or algorithmic as some of the other top cameras around.

However, the AF seems much improved over the SL3 in low-light conditions. I tested both cameras in extremely dim environments and, while the SL3 often struggled, the SL3-S did a great job of finding my subjects. The only real black mark against the stills performance is the pixel shift multi-shot capability, as the 48MP and 96MP composites were a bit muddy and I wouldn't recommend using them.

In terms of its video capabilities, the Leica SL3-S boasts a similar performance to the Lumix S5 IIX (it even blacks out the company logo in the same way as the S5 IIX, too) but with a few differences and key improvements. Both cameras offer headline specs of 6K open gate at up to 30p, C4K/4K/Full HD at 10-bit 4:2:2, internal 5.8K ProRes capture with no limits, recording to an external SSD and so on.

However, the specs have been bumped in a few areas. For starters, the Leica's 24.6MP sensor is a brand new and back-side illuminated affair. This enables it to achieve a far greater range of sensitivity, which goes all the way from ISO 50 to ISO 200,000, with Dual Basis ISO at 50-560 and 640-200,000 with superior dynamic range and noise performance. There's also the adoption of a split CFexpress Type B / UHS-II SD card setup, giving you the option of a more stable memory format, which is even more important when shooting at high frame rates and bitrates. The viewfinder and LCD screen are better, too, inheriting the 5.76 million-dot EVF on the SL3 (compared with the S5 IIX's 3.68 million) and 3.2-inch, 2.33 million-dot rear screen (versus the 3-inch, 1.84 million affair on the Lumix). One major difference between the two screens, though, is that the Leica's LCD is tilt-only, which is less than ideal for videography. On the other hand, the Lumix has a clear edge in the controls. The Batman-like unmarked buttons and dials add to the stealthiness and cool factor of the SL3-S, but if you would

> *"Though cynics say it doesn't count, the shooting experience of the Leica SL3-S is absolutely exquisite"*

Meet the rivals…

The cameras taking on the Fujifulm X-S20…

Canon EOS R6 Mark II
£2,779/$2,499
Hybrid camera that packs an obscene amount of firepower, with 6K video and 24.2MP stills at 40fps.
Reviewed: issue 264
★★★★½

Lumix S5 IIX
£2,299/$2,198
Will suit creators or filmmakers seeking a top-tier compact hybrid camera to produce content for pro workflows.
Reviewed: issue 272
★★★★★

Nikon Z6 III
£2,699/$2,499
A stunning stills camera with superb autofocus – the new vari-angle screen makes the Z 6III ideal for videography, too.
Reviewed: Issue 285
★★★★★

James Artaius

James Artaius

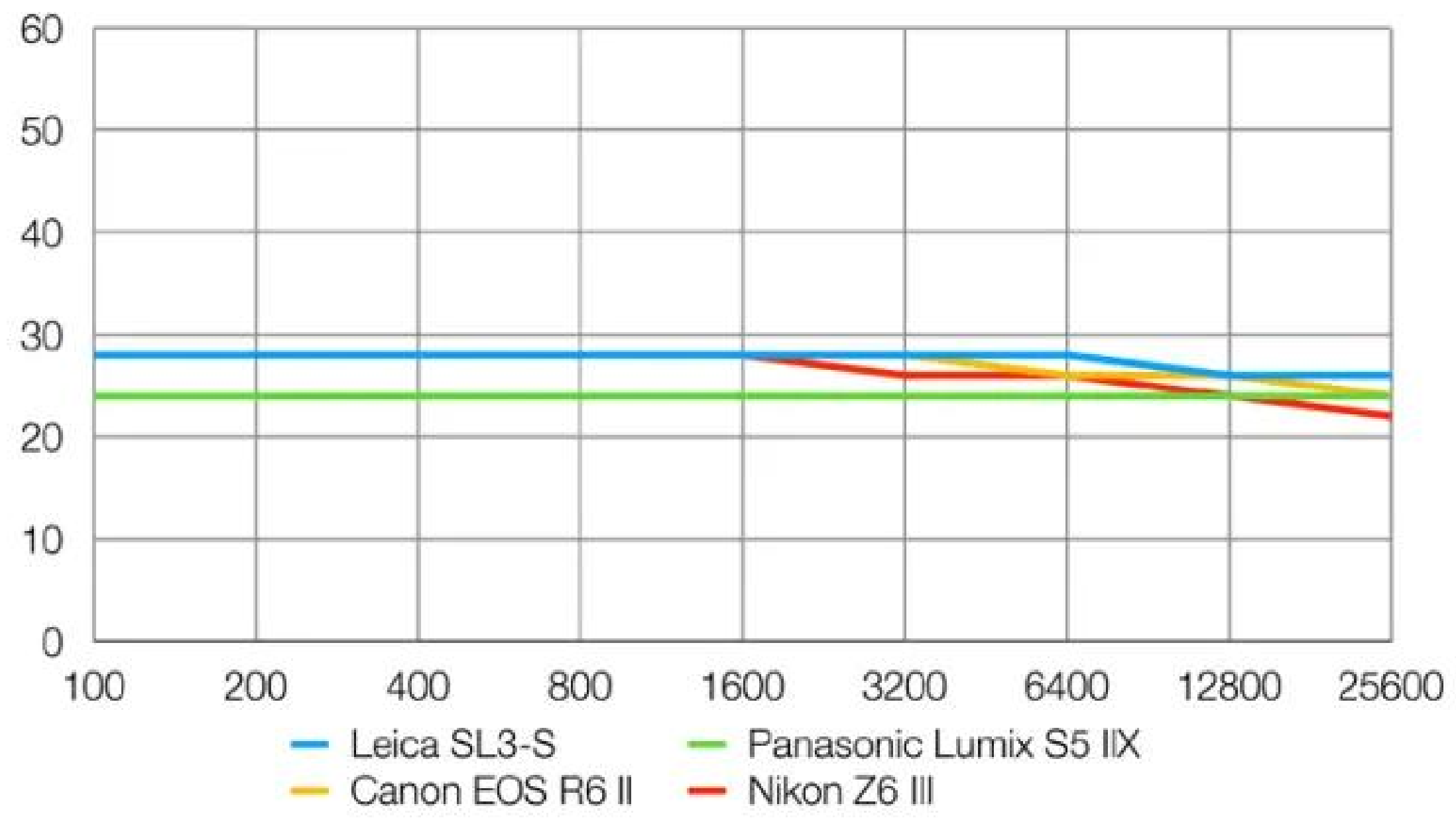
Top: Leica SL3-S and Leica Summilux SL 50mm f/1.4 ASPH (1/80 sec at f/1.4, ISO 250)
Above: Leica SL3-S and Leica Summilux SL 50mm f/1.4 ASPH (1/25 sec at f/1.4, ISO 64)

prefer to have rapid access to your settings, then the S5 IIX's clearly labelled excess of controls really make life easier.

And, while I enjoy Leica's streamlined menus for friction-free photography, I don't know that their sleek nature is optimum for video; the Lumix displays settings and options in a more conventional way that will better fit seasoned shooters. Though, conversely, Leica's intuitive menus make things like open gate feel a lot more accessible to non-videographers.

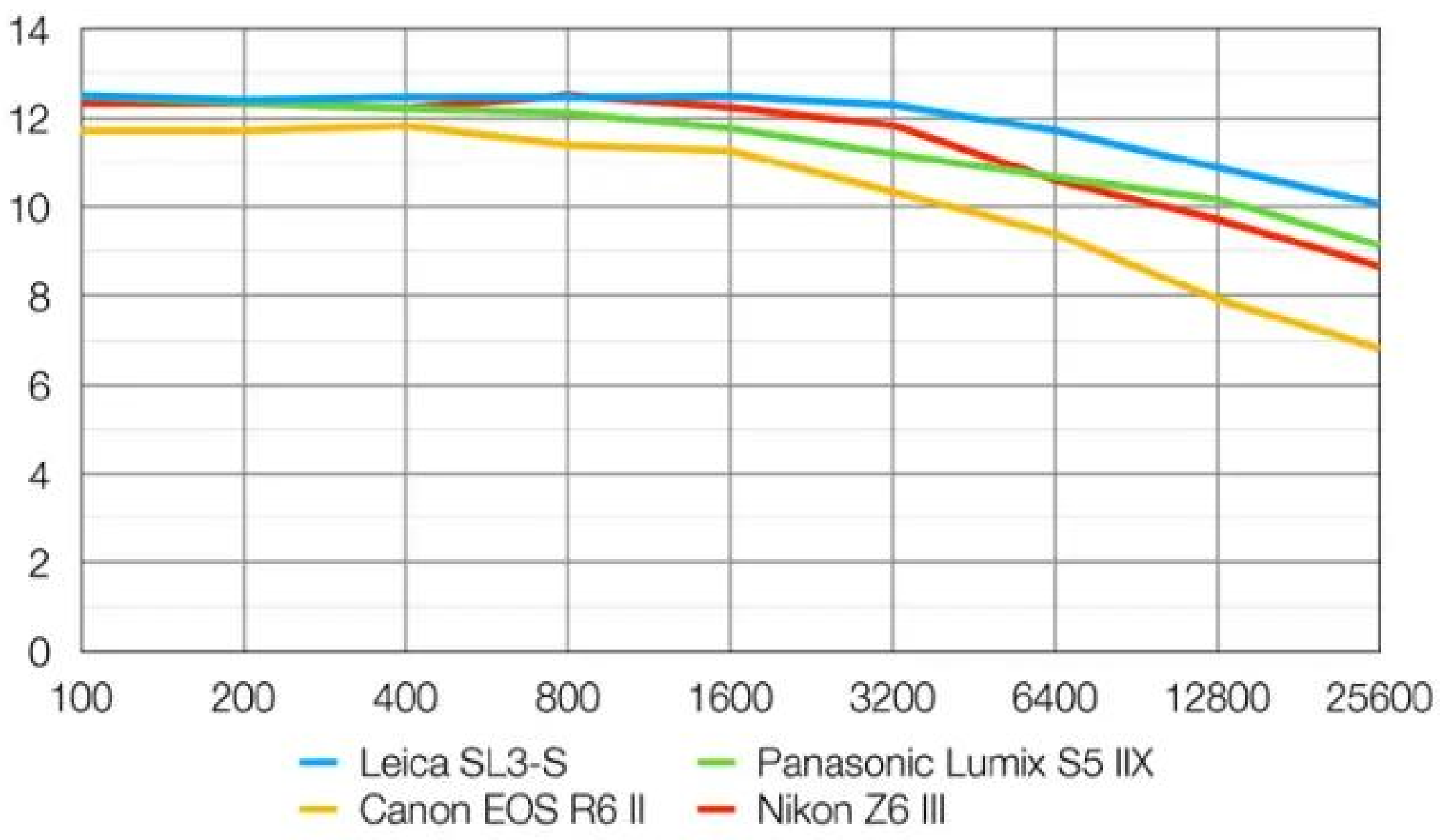
Performance is generally great, though; like the SL3, the AF feels somewhat less responsive in video compared to stills – again, it's less predictive and tends to behave best when you tell it exactly where to autofocus rather than expecting it to know or predict. ***James Artaius***

RESOLUTION



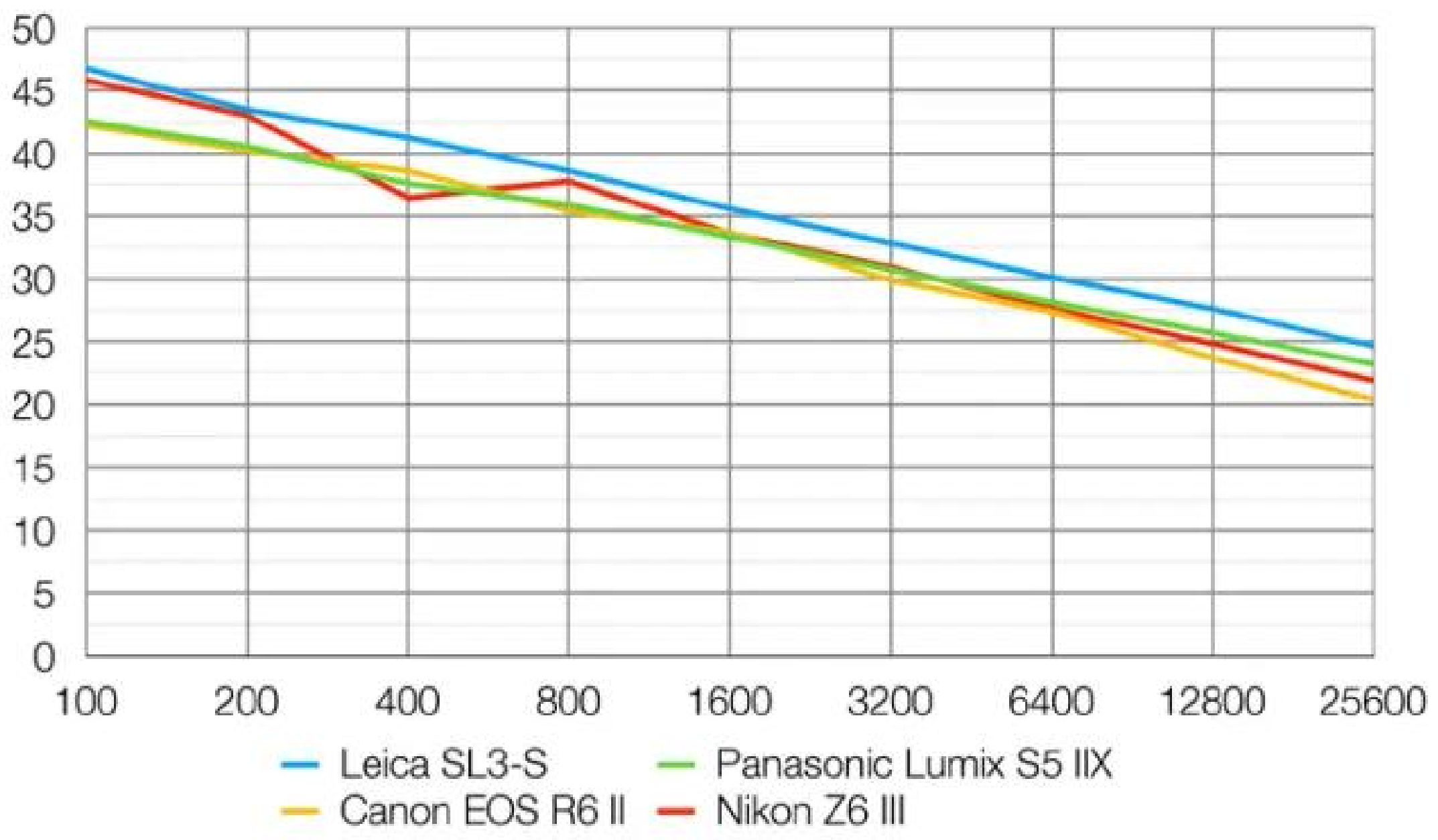
The SL3-S performs on a par with EOS R6 II and Z6 III at lower sensitivities, but Leica's excellent noise control at higher ISOs means fine detail is more easily visible, leading to slightly higher resolution scores.

DYNAMIC RANGE (EV)



Leica has tuned the image processing of the SL3-S and it's worked. The SL3-S captures an excellent dynamic range, especially at higher ISOs, and maintains a margin over the S5 IIX on which it's based.

SIGNAL-TO-NOISE RATIO



Though all four cameras control image noise well, the SL3-S is still the camera to beat. Right through our tested sensitivity range, it consistently delivers clearer image quality than the competition.

WE SAY...

The Leica SL3-S is a triumph for the red dot brand and its commitment to a mirrorless system that comes on by leaps and bounds every generation. The back-side illuminated sensor delivers some of the best image quality we've seen from a 24MP body, and, with its blistering 30fps bursts and 6K open gate recording, it's one of the best hybrid cameras around.

VERDICT

FEATURES	★★★★½
BUILD & HANDLING	★★★★★
PERFORMANCE	★★★★½
VALUE	★★★☆☆
OVERALL	★★★★½

Nikon Z 7II

£2,999/$2,997 (body only)

With double the processing power and a second card slot, the Nikon Z 7II looks like a solid upgrade

CSC www.nikon.co.uk

Although Nikon took its time to get serious about mirrorless cameras, when it introduced the Z 6 and Z 7 in August 2018, it managed to avoid giving them a 'first generation' feel. Instead, they felt like fully rounded, competent cameras for enthusiast and professional photographers. In fact, there was only really one aspect that drew criticism – the one memory card slot. Nikon's explanation was that by opting for an XQD card slot (a firmware upgrade later made this compatible with CFexpress cards as well) the cameras had a very secure form of storage, and their size could be kept down. For some this was persuasive, but others, especially wedding photographers and anyone shooting once-in-a-lifetime-moments professionally, wanted the reassurance of a second card. Consequently, one of the key upgrades that the Z 7II (and Z 6II) makes is the addition of a second card slot. Rather than go for two XQD/CFexpress card slots, Nikon has opted for an XQD/CFexpress and SD/SHC/SDXC UHS-II card pairing. As SD-type media is more widely available and more affordable than XQD/CFexpress, it's a popular decision. One card can be set to act as an overflow or a back-up to the other, or RAW files can be saved to one card and JPEGs to the other.

In another doubling move, Nikon has also given its second-generation full-frame mirrorless cameras a second Expeed 6 processing engine. That gives the Z 7II a number of performance enhancements over the Z 7, including pushing the maximum continuous

Features

Tilting Screen
While a vari-angle screen would be better, the Z 7II's 3.2-inch, 2.1 million-dot screen can be tilted up or down for easier viewing from high or low positions.

Dual processors
The Z 7II has two Expeed 6 processors to boost performance and enable eye detection during video shooting. The Nikon D6 only has one processor.

Two card ports
Nikon has added an SD/SDHC/SDXC UHS-II card slot alongside the Z 7II's XQD/CFexpress slot, enabling overflow, back-up or split storage of RAW and JPEG files.

OLED Viewfinder
Nikon has given the Z 7II the same OLED electronic viewfinder as the original Z 7, with aspherical glass elements and coatings to repel dirt, prevent flare and reduce reflections.

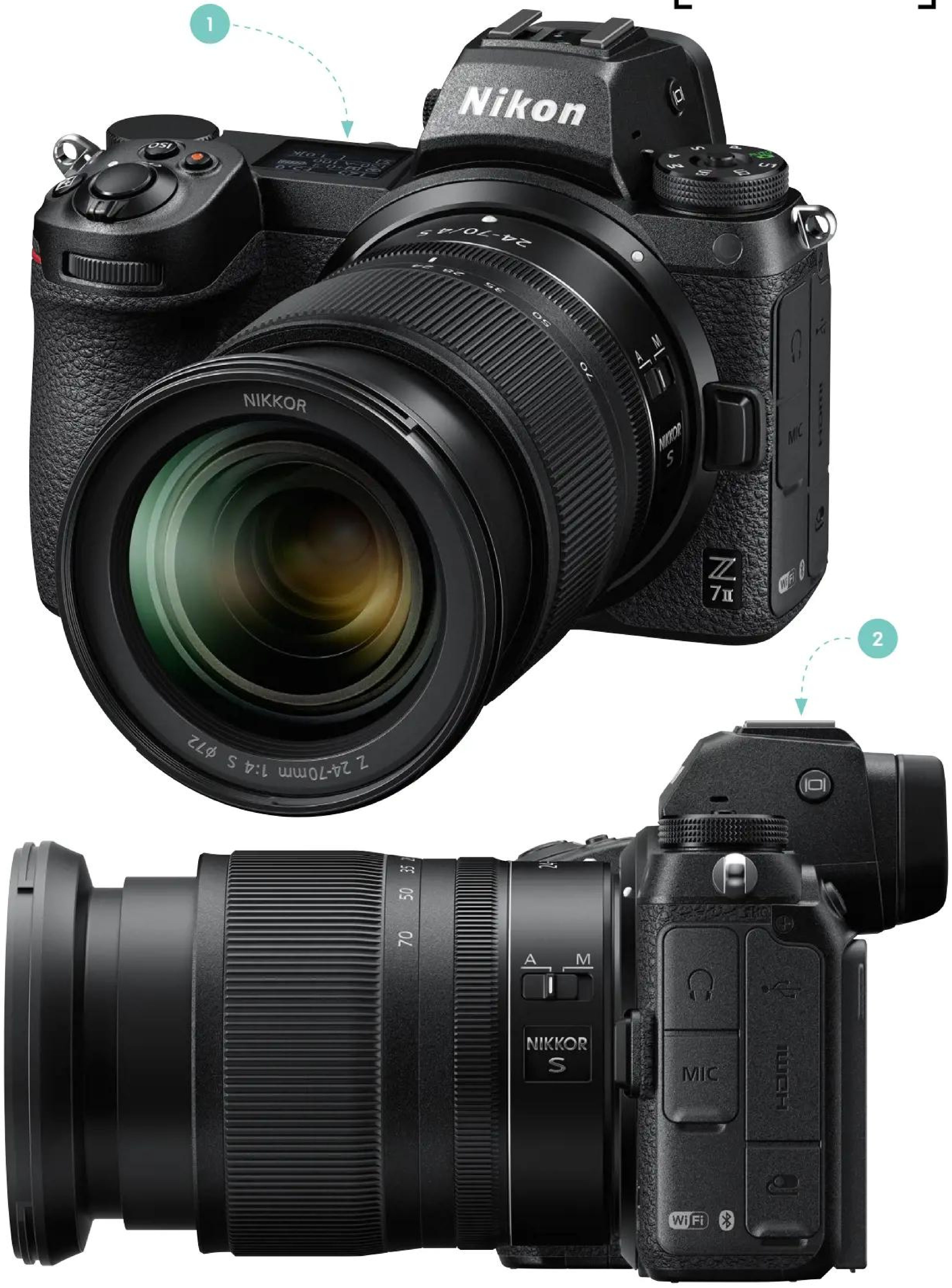
New Battery
The Z 7II comes with an EN-EL15c battery, which has a higher capacity than the Z 7's EN-L15b – but it can accept this or the EN-L15 and EN-L15a batteries.

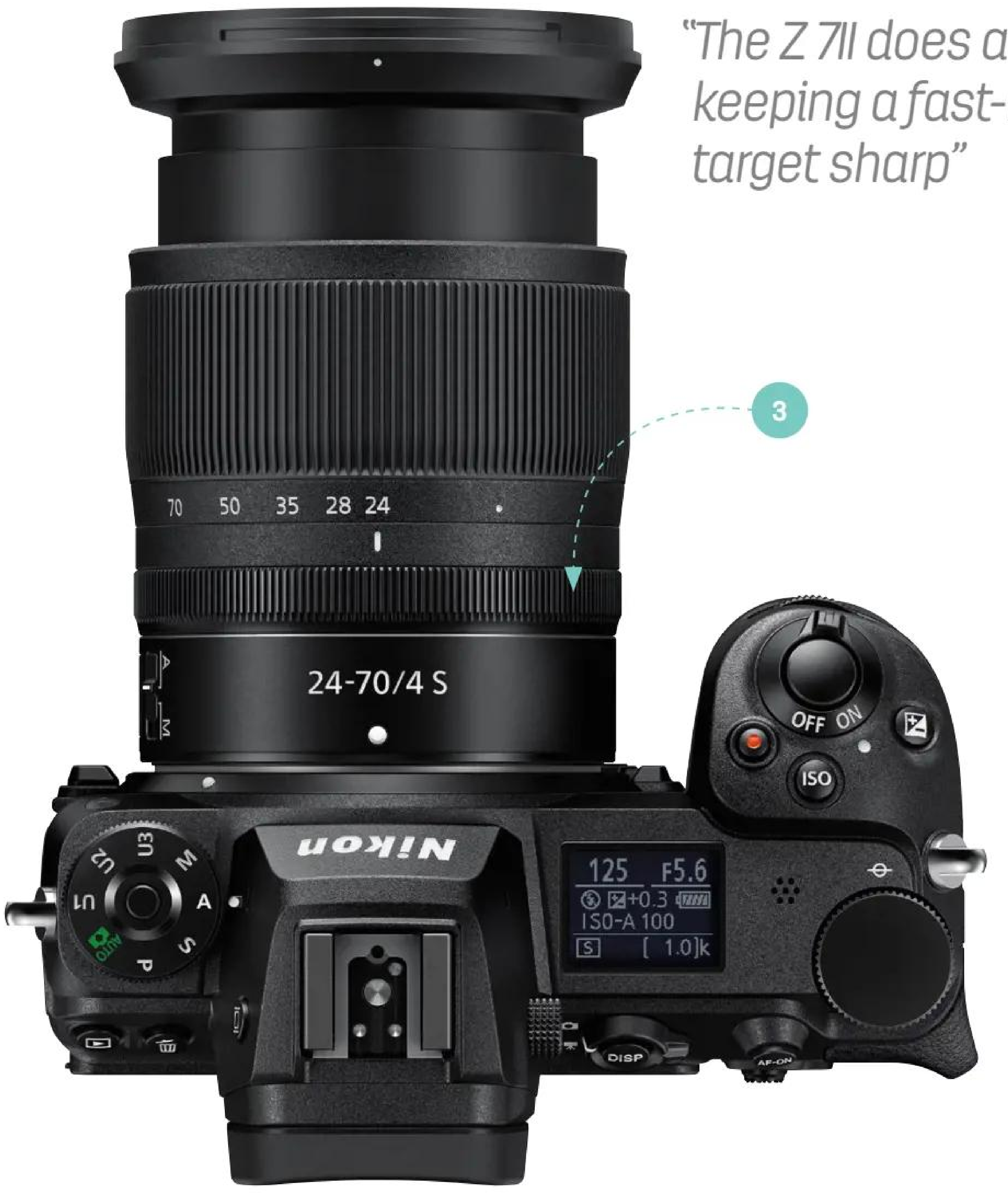
ProRes RAW
For £179/$199 Nikon can upgrade the Z 7II to enable ProRes RAW video recording to an Atomos Ninja V external recorder connected via the mini HDMI port.

TILTING SCREEN

shooting rate from 9fps with the original camera to 10fps. That rate can also be maintained for up to 77 12-bit lossless compressed RAW files, which is about three times the number of shots possible with the Z 7, making the Z 7II a better option for sport and action photography.

As Nikon has used the same full-frame 45.7MP backside-illuminated (BSI) sensor for the Z 7II as is in the original Z 7, the new camera has the same hybrid autofocus hardware, with 493 AF points covering approximately 90 per cent of the imaging area. However, the dual Expeed 6 processors enable the Z 7II to focus in lower light than the Z 7. In the default arrangement it's sensitive down to -3EV, but when Low Light AF mode is activated, it goes down to -4EV. That's a noticeable improvement, and the Z 7II's AF system seems faster and more decisive in low-light conditions.





> "The Z 7II does a great job of keeping a fast-moving target sharp"

1

Tough build
The magnesium alloy body and weatherproof seals make the Z 7II built to last.

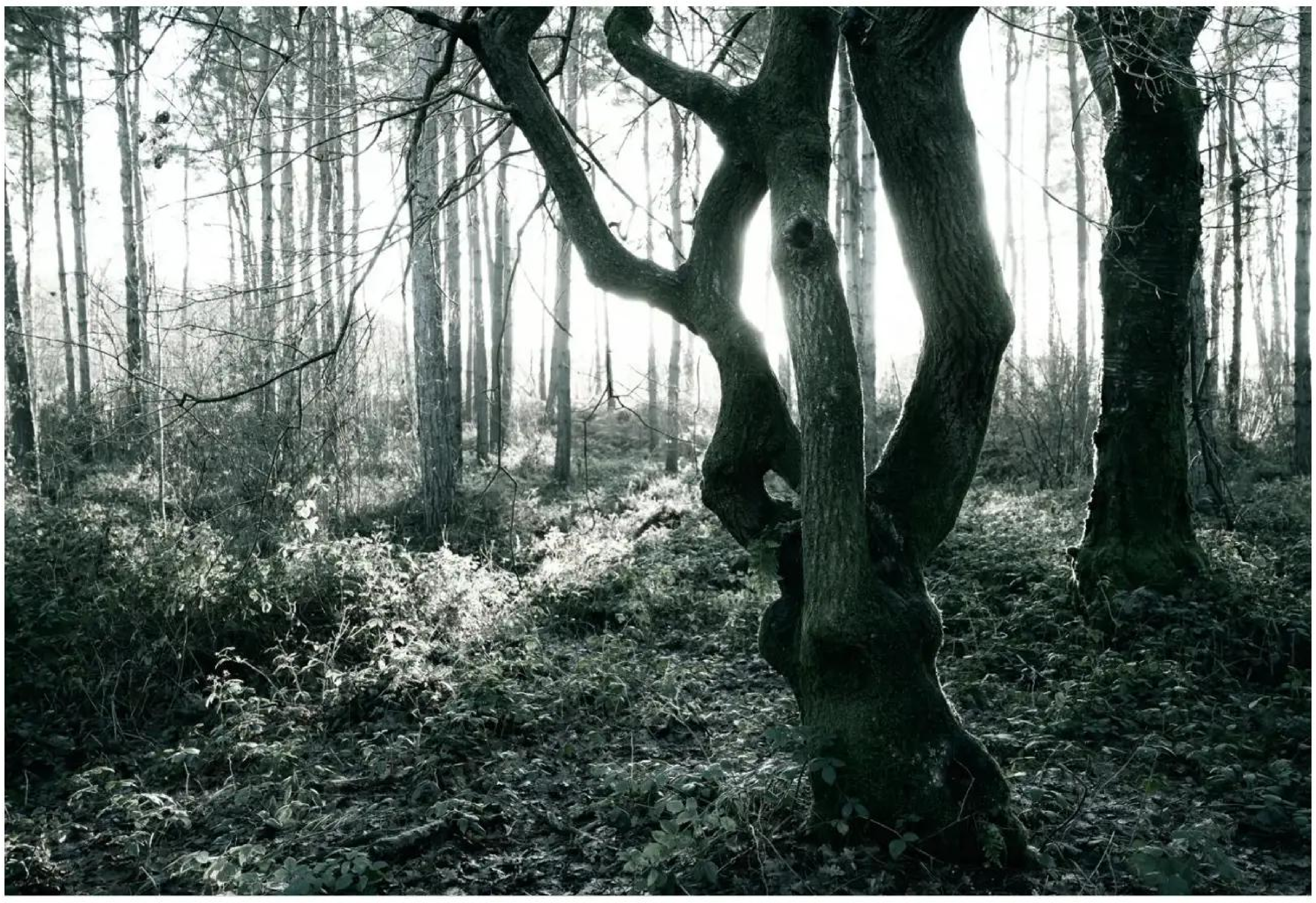
2

Subtly larger
The second card slot and processor make the Z 7II 2mm deeper than the Z 7.

3

Big mount
Nikon's Z mount measures 55mm in diameter – 8mm wider than the F mount– so it can let in more light.

x4 © Angela Nicholson



Below
The viewfinder provides a decent preview of exposure, white balance and colour, so you can perfect the settings before taking the shot

Right
Thanks to the 45.7MP sensor and superb optics, the Z 7II captures an excellent level of detail and attractive bokeh

Left
There are better eye-detection systems, but the AF system is fast and accurate when you set the AF point

The extra processing power also extends the eye detection to video as well as stills, and it can be switched between human and animal eye detection. While this is useful when the subject is stationary or moving slowly, our tests found it unreliable when the subject moves quickly, so it's often best to use Single-point AF, Dynamic-area AF or Wide-area AF (Small) and keep the active AF area over the subject in the frame as you shoot. With the AF point over the subject, the Z 7II does a great job of keeping a fast-moving target sharp. Despite the extra processing power, Nikon hasn't mentioned any changes to the noise reduction algorithm used by the Z 7II, and the sensitivity range remains the same as the Z 7 – ISO 64-25,600, expandable to ISO 32-102,400.

I recommend staying within the native range and making ISO 6400 the maximum setting if possible. Once the sensitivity hits ISO 16,000, JPEGs lose detail, and the shadows can look a bit mushy, making RAW files a better option.

As usual, Nikon's Matrix Metering mode proves a dependable choice, but the brightness of the subject under the active AF point can influence the exposure. However, as the viewfinder gives an accurate preview of the final image, you can adjust the exposure compensation accordingly to get the result you want.

The viewfinder is also useful for assessing which white balance setting to use. There are several Auto White Balance options, so it's worth tinkering to see which works best for the shooting conditions. Generally, in natural light, A1 'Keep over atmosphere' or Natural Light Auto work well.

Nikon's DSLRs and full-frame mirrorless cameras have a good reputation for dynamic range, and the Z

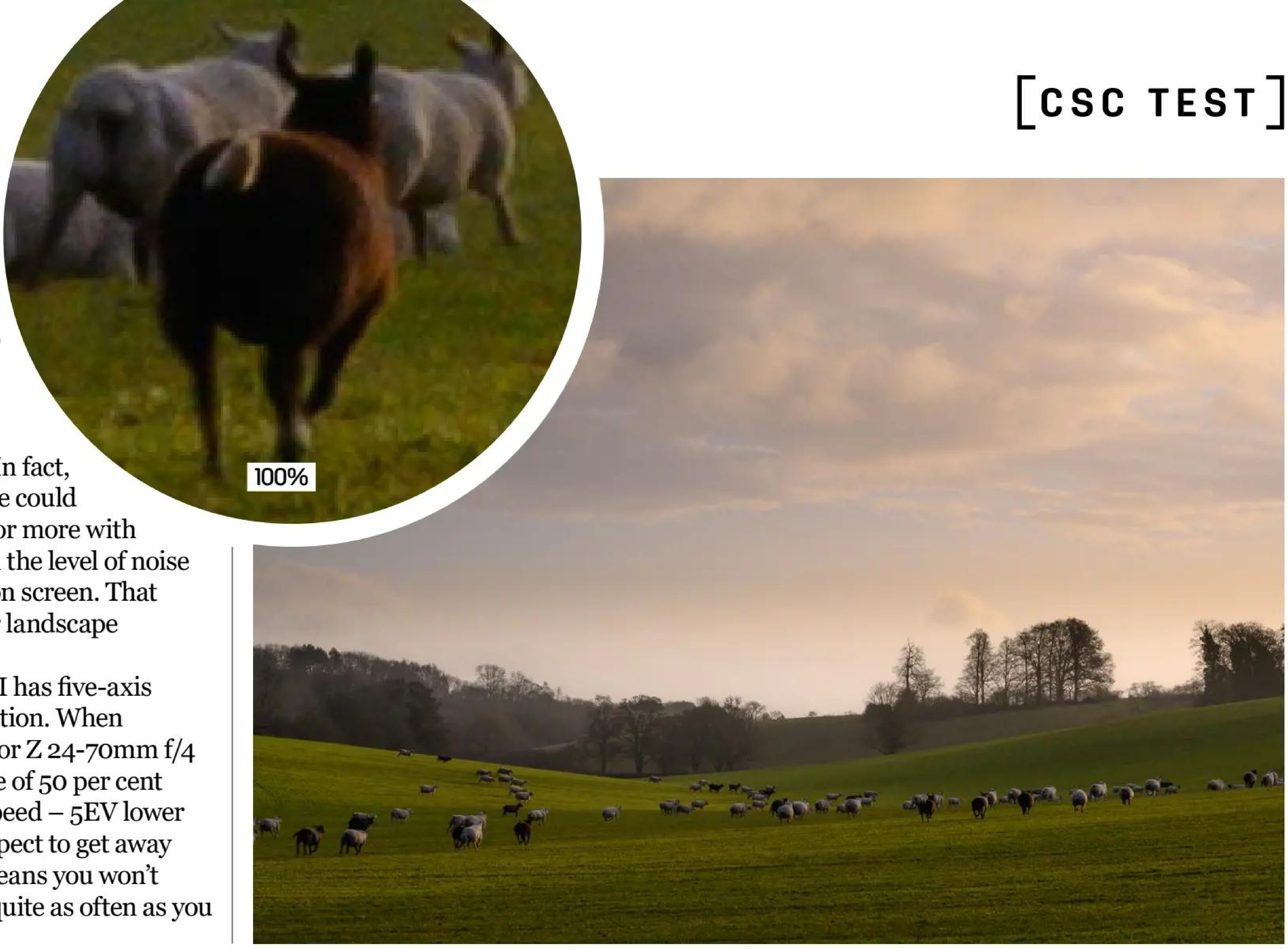
Picture Controls

Nikon's Picture Controls, which give JPEGs a particular look, have been around for a long time, but the range has expanded to include more creative options, such as Dramatic, Denim and Bleached. Adobe Camera Raw also enables the Picture Controls to be applied to RAW images and the results edited, so they offer a way of previewing the final look in-camera.

The Picture Controls can also be edited in-camera or using Nikon's Picture Control Utility 2 software, with the software letting you create your own Picture Controls to upload to the camera. And, with Nikon's SnapBridge technology enabling shots to be transferred automatically to a smartphone, Picture Controls are a great way of ensuring images are share-ready in-camera.

7II continues this trend. This means that it captures a wide range of tones, and if you need to underexpose a low-ISO image a little to protect the highlights, you can expect to be able to brighten the shadows. In fact, in our tests we found we could brighten them by 4EV or more with only a slight increase in the level of noise visible at 100 per cent on screen. That could be very useful for landscape photographers.

Like the Z 7, the Z 7II has five-axis in-body image stabilisation. When shooting with the Nikkor Z 24-70mm f/4 S, we achieved a hit rate of 50 per cent when using a shutter speed – 5EV lower than you'd normally expect to get away with handheld. That means you won't need to carry a tripod quite as often as you might be used to.



> *"Nikon's DSLRs and full-frame mirrorless cameras have a good reputation for dynamic range, and the Z 7II continues this"*

NIKON Z 7II

Megapixels (effective)	45.7
Max resolution	8,256 x 5,504
Sensor information	Full-frame (35.9 x 23.9mm) CMOS
Shutter speed	1/8,000 to 30sec, Bulb, Time
ISO sensitivity	64-25,600, expandable to 32-102,400
Exposure modes	Auto, Program, Shutter Priority, Aperture Priority, Manual
Metering options	Matrix, Centre-weighted, Spot, Highlight-weighted
Flash modes	Hot-shoe mounted: front-curtain sync, slow sync, rear-curtain sync, red-eye reduction, red-eye reduction with slow sync, off
Connectivity	Bluetooth, Wi-Fi, SnapBridge, USB-C, HDMI, audio in and out, accessory port
Weight	615g body only, 705g with battery and memory card
Dimensions	134 x 100.5 x 69.5mm
Batteries	EN-EL15c rechargeable Li-ion battery
Storage	Dual slot: XQD/CFexpress card and SD/SDHC/SDXC
LCD	3.2-inch, 2.1 million-dot tilting touch-screen
Viewfinder:	0.5-inch 3.69 million-dot OLED

FEATURES

There's plenty to entice stills photographers, and those who want to mix in a bit of video too

★★★★☆

BUILD QUALITY

Robustly built from magnesium alloy and ergonomically shaped, the Z 7II feels great in your hand

★★★★★

HANDLING

An excellent interface, touchscreen and control layout make the Z 7II a lovely camera to use

★★★★★

QUALITY OF RESULTS

It produces superb-quality stills and video, provided you don't rely heavily on eye detection

★★★★★

VALUE FOR MONEY

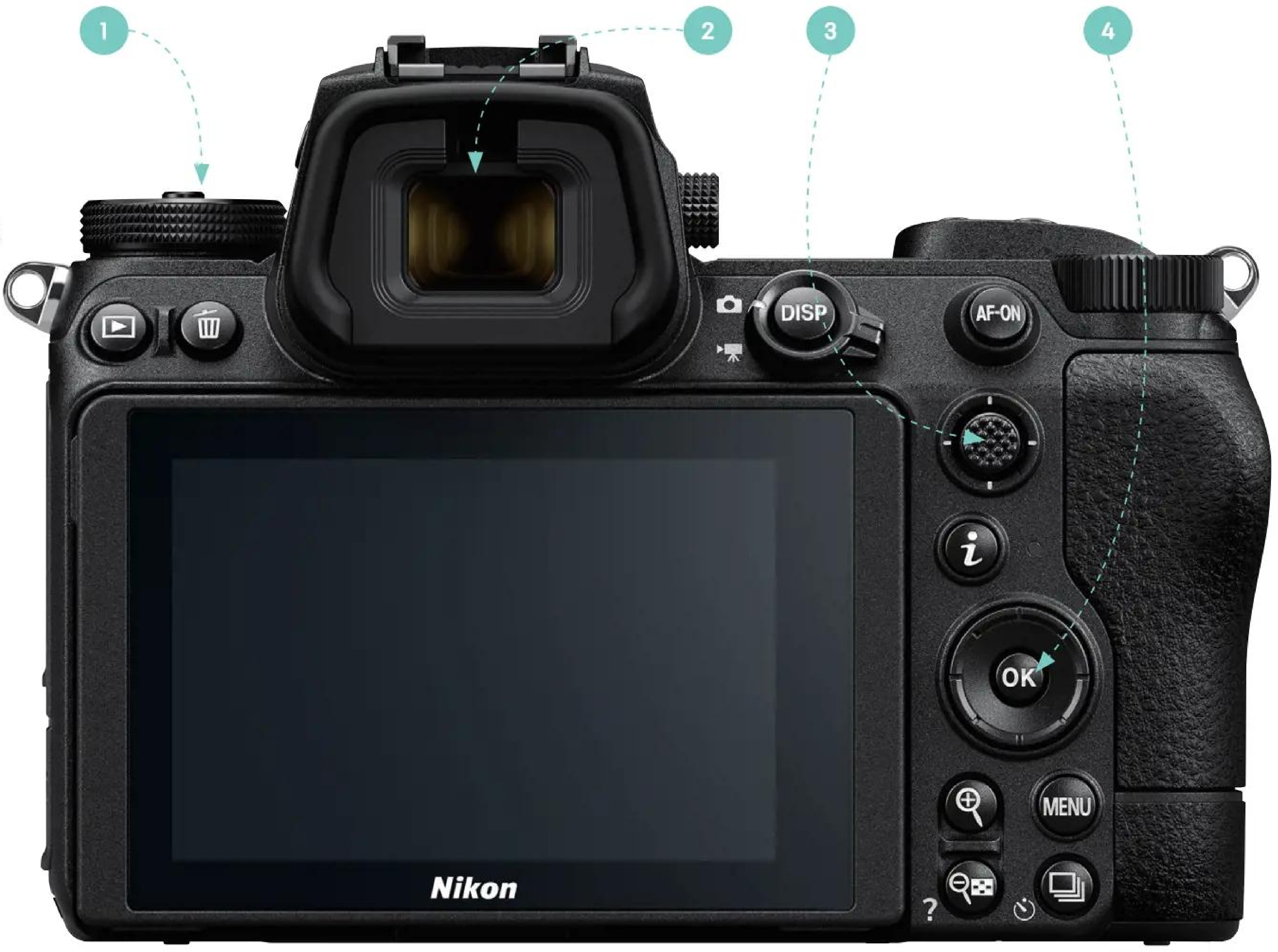
There's stiff competition, but the Z 7II is a camera that photographers can fall in love with

★★★★☆

Overall

The Z 7II doesn't have enough to entice many Z 7 owners to upgrade, but it's a great high-resolution camera for anyone switching to mirrorless or full-frame photography.

★★★★☆



① **Dual dials**
Front and rear/top dials make adjusting the exposure as you look in the viewfinder a quicker process.

② **Eye sensor**
This sensor detects when you're looking at the viewfinder, firing it up while turning off the main screen.

③ **Joystick**
This control is perfectly positioned for shifting the AF point around the frame with your thumb.

④ **Touch control**
The menu can be navigated by touch, or you can use the control pad.

Nikon
NIKKOR
Z
DISP
AF-ON
OK
MENU

CSC www.canon.co.uk

Nikon Z 8

£3,789/$3,699

Adam Waring considers whether the Z 8 is the spiritual successor to the D850 or a baby Z 9. Either way, he finds an impressively powerful camera

Rumours of a Nikon Z 8 mirrorless camera, fitting somewhere between the Nikon Z 7 II and Nikon Z 9 in the range, have been doing the rounds for years. The manufacturer is touting the Nikon Z 8 both as the 'true successor to the Nikon D850' and a 'baby Z 9' – and these are both fair descriptions. Indeed, it looks and feels like the Z-series equivalent of the D850, with a similar shape, yet squeezes almost all the high-end specs of the flagship Z 9 into a smaller (and more affordable) body. The Z 8 may be the best Nikon camera we've seen – but how does it stack up against its rivals from other brands, such as the Sony A1 and Canon EOS R5?

Kicking off the headline specs that the Nikon Z 8 shares with its bigger brother, it has the same 45.7MP stacked CMOS sensor, boasting the fastest scan rate in any commercially available camera. While this isn't a 'global' sensor that captures the entire image instantaneously but renders the image line-by-line in the same way as traditional sensors, it does this incredibly quickly. So quickly, in fact, that the camera forgoes the need for a mechanical shutter entirely. Taking a step back for a moment, there are plenty of 'shutterless' cameras out there (including the one in the smartphone) and most existing DSLRs and mirrorless cameras have the option of an electronic shutter mode, but these suffer from rolling shutter distortion.

That brings us to the second headline spec: the max shutter speed is 1/32,000 sec. That's four times faster than that found in most high-end cameras, which typically top out at 1/8,000 sec (while entry-level models are even slower at 1/4,000 sec).

> "The 45.7 megapixel sensor is the same one found in the Z 9, with 493 AF points"

The benefits of the shutterless design don't end there. Like the Z 9, the Z 8 can shoot continuously at an astonishing 120fps. Admittedly these are low-resolution jpegs (if you can call 11MP low-res – it's almost the equivalent of one frame of 4K video), but it can still shoot high-resolution 45.7MP jpegs at 30fps, or RAW files at 20fps – all this with full autofocus and autoexposure between frames.

This speed-freakery isn't solely down to the advanced sensor and shutterless design but is also due to the Z 8 sharing the same cutting-edge Expeed 7 processor first seen in the Z 9. Another advantage of this next-gen processor is that it can capture more than 1,000 RAW images at 20fps before the buffer causes it to slow down – provided you have a fast enough memory card. And with jpegs, you can keep rattling off full-resolution images at 30fps until the card is full.

As mentioned, the 45.7MP sensor is the same one found in the Z 9, with 493 AF points

Features

Full-frame sensor
The Z 8 uses a full-frame (FX) format CMOS chip, which is back-side illuminated, for improved signal-to-noise performance.

Electronic shutter
While many cameras have featured an electronic shutter mode, the Z 8 dispenses with the mechanical type altogether. The top shutter speed is a rapid 1/32,000 sec.

Battery
Unlike the Z 9, which uses the larger EN-EL18D battery, the Z 8 makes do with the same EN-EL15C used by the Z 7 series of cameras.

ISO range
Despite the relatively high pixel count of 45.7MP, the Z 8 still manages a top native sensitivity of 25,600, expandable to ISO 102,400. Interestingly, a base sensitivity of ISO64 is available over the conventional ISO100.

Expeed 7 processor
The Z 8 is powered by the same Expeed processing engine as the Z 9, which contributes greatly to its speed and resolving power.

Articulated LCD
The camera features a similar dual-axis tilting LCD to the Z 9, which can be angled 90° horizontally or vertically for high- and low-angle shooting in both landscape and portrait.

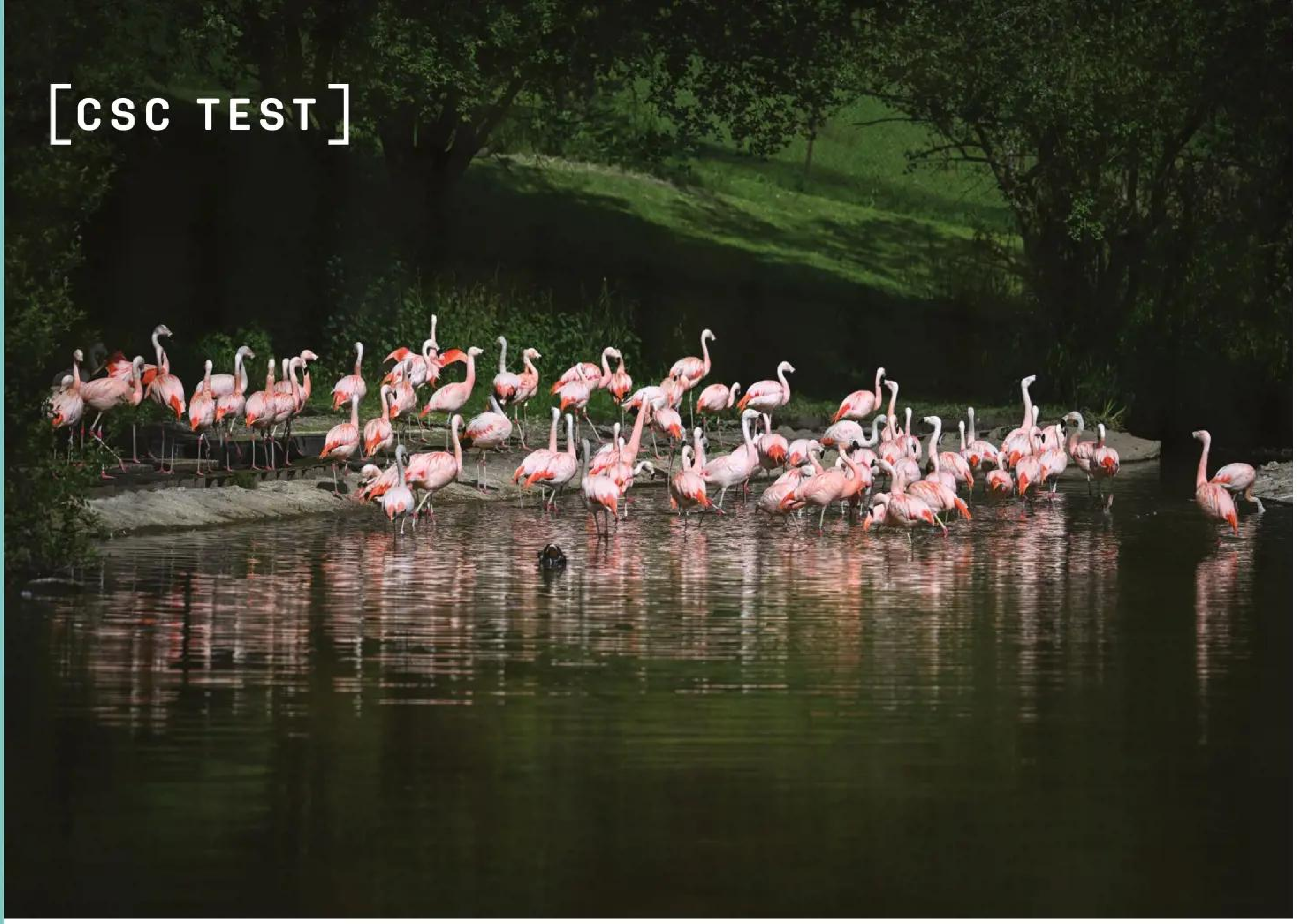
SENSOR

covering 90 percent of the sensor area, enabling the advanced AF system to pick up subjects towards the edges of the frame. It's a back-side illuminated stacked sensor that boasts much-improved lowlight capabilities over traditional designs, as all the electronics are 'stacked' behind the photosites. This results in an enhanced dynamic ISO range of ISO64-25,600 (ISO32-102,400 expanded).

The autofocus system doesn't merely match that of the Z 9, it surpasses it, with even more responsive subject tracking, thanks to advancements in Nikon's deep-learning AF tech. However, clever though the autofocus may be, it's still not quite a match for Canon and Sony. While we're seeing performance parity when it comes to subjects such as people, vehicles and inanimate objects, it falls just short of its rivals when it comes to detecting and tracking animals.

PHOTO SHOOTING MENU
Photo flicker reduction OFF
High-frequency flicker reduction OFF
Metering
Flash control
Flash mode
Flash compensation 0.0
Focus mode AF-S

All © Adam Waring



Nikon is aiming this camera at moviemakers as much as it is at stills shooters and, like the Z 9, the video quality is exceptional. The oversampled 4K remains a cut above Sony and Canon's cameras, while the quality of the 8K video is every bit as impressive.

Furthermore, while its smaller battery can't match the chunky one used to power the Z 9, we found it far surpassed the CIPA rating of 275 shots. Handling-wise, on the outside, this camera feels very much like the mirrorless equivalent of the D850 – albeit in a body that's around 15 percent smaller. It's certainly noticeably chunkier than Nikon's Z 6/7 line of cameras and boasts many more direct-access controls, something that those migrating from DSLRs like the D850 will undoubtedly appreciate. The camera is built around a magnesium alloy chassis and is fully weather-sealed to withstand extreme temperatures, humidity and dust. Overall, it handles beautifully.

The Nikon Z 8 is, for all intents and purposes, a Z 9 crammed into a smaller body. It borrows many of its handling characteristics from the Nikon D850 – widely considered to be the best all-round DSLR ever made – and has a fair shout at staking its claim to be the best all-round full-frame mirrorless the world has seen.

x5 © James Artaius

Above Pond light: Nikon is selling the Z 8 as an 'all rounder' with high-res fast frame rates and good low-light performance

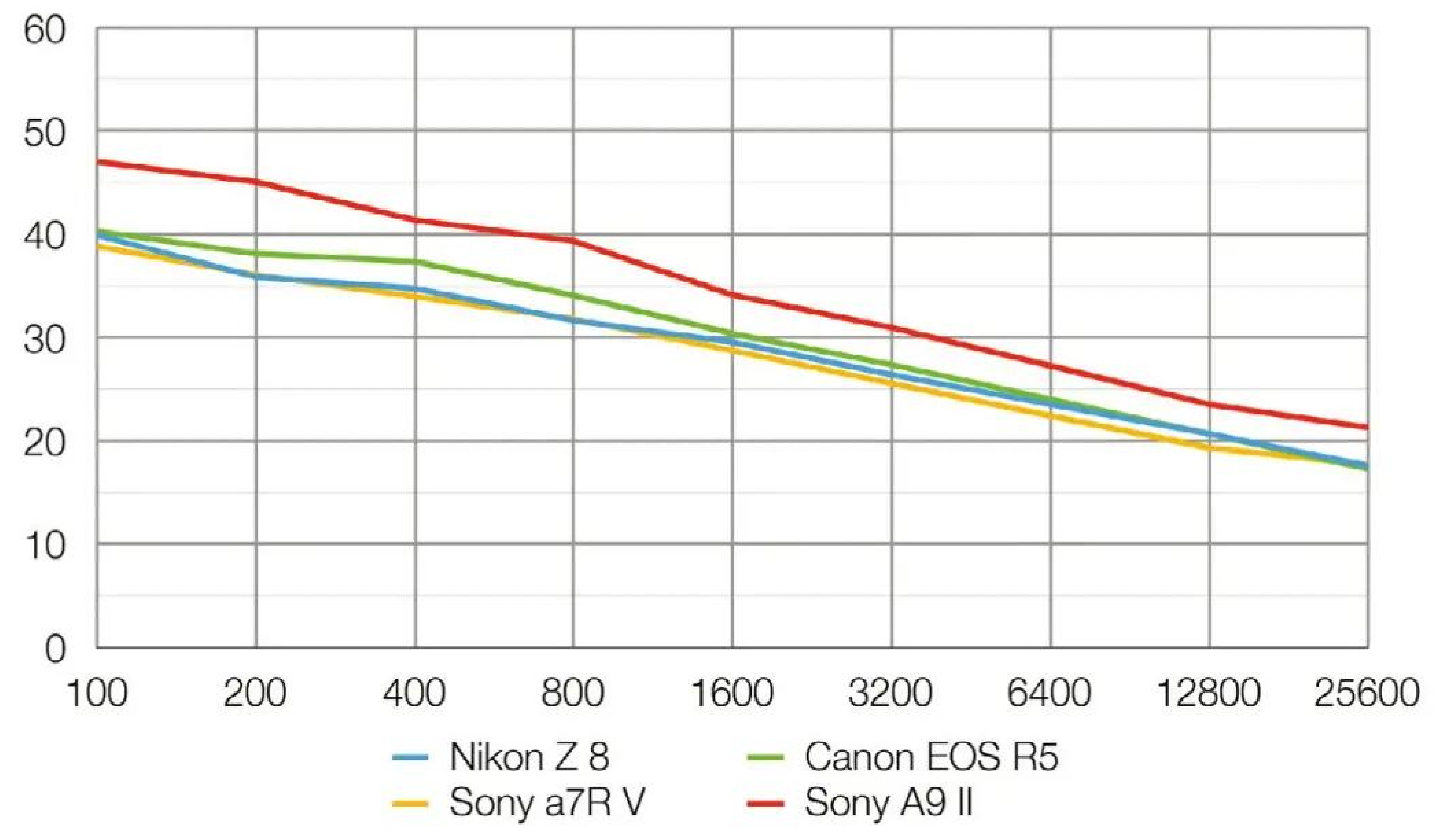
Left King of specs: Nikon has crammed all the Z 9's specs into a more compact body. The sensor readout makes a mechanical shutter curtain redundant

Signal-to-noise ratio

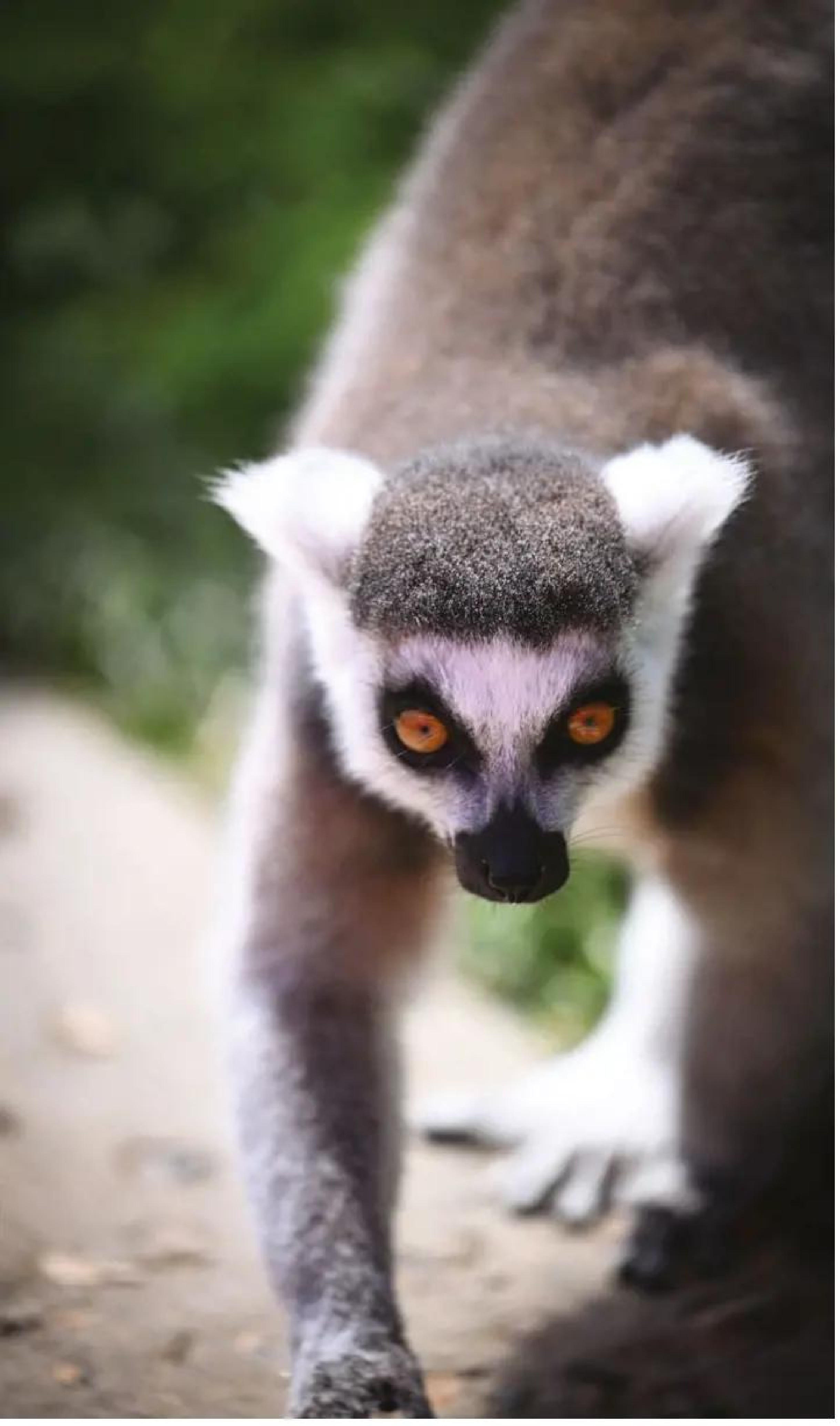
Our lab test compares the amount of random noise generated by the camera at different ISO settings as a proportion of the actual image information (the 'signal'). Higher values are better and we expect to see the signal to ratio fall as the ISO is increased.

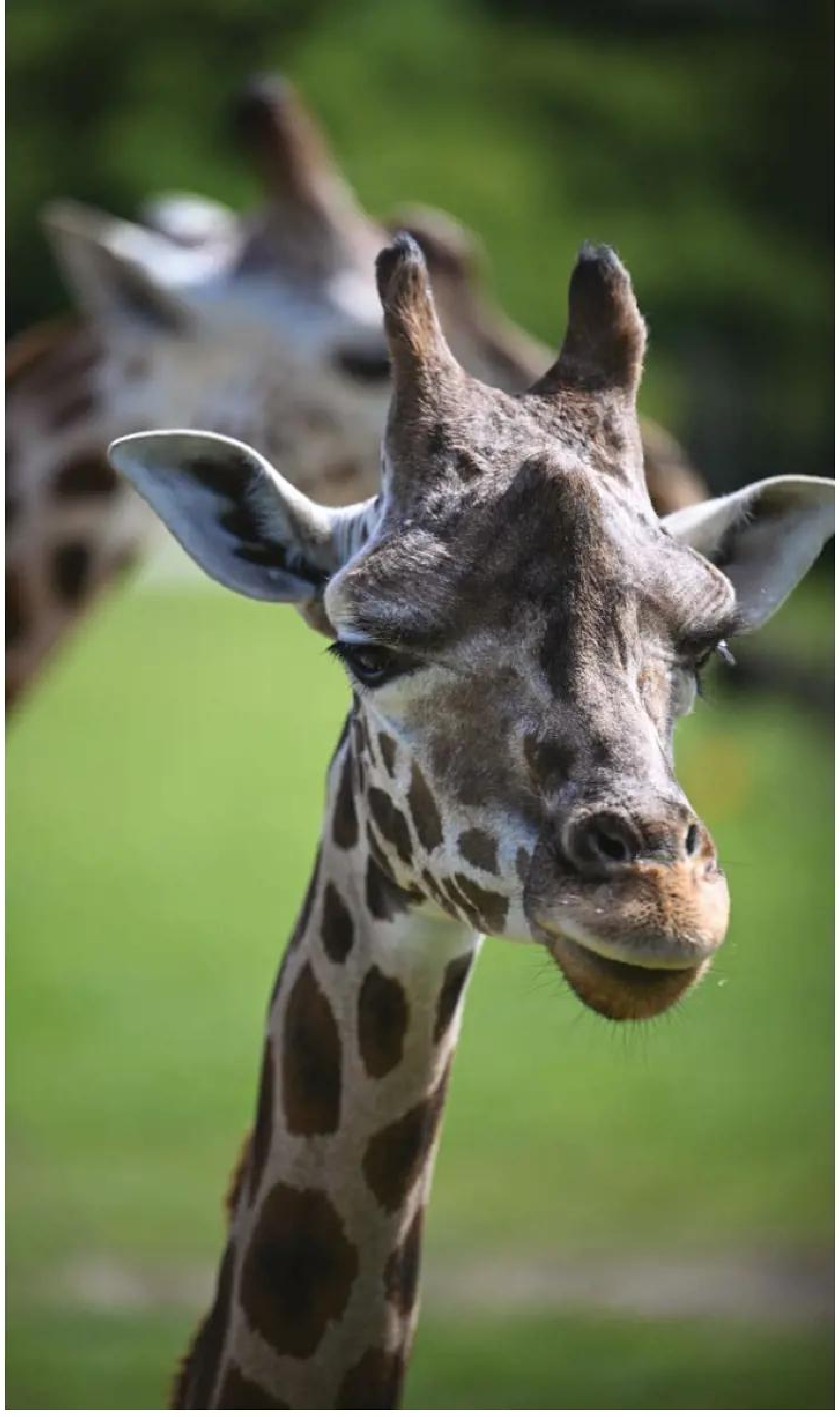
There's little to separate the three 45MP+ cameras on test here, as the Nikon Z 8, Canon EOS R5 and Sony A7R V each have similar noise levels at all tested ISO levels. But it's here that the A9 II's lower megapixel count comes into its own. Thanks to having fewer – and therefore larger – individual sensor photosites ('pixels'), the A9 II is able to capture more light in a given exposure duration and, consequently, produces less noise.

Of course, for everyday work, most professional photographers are going to consider the best balance of resolution and noise performance, making the Nikon Z 8's contribution a standout one. It manages to cross genres, being an ideal studio camera, as well as turning its hand to sports and action – much like the D850.



Signal to noise ratio (decibels)
The Nikon Z 8, Canon EOS R5 and Sony A7R V each have similar levels of noise, however, the Sony A9 II's lower megapixel count means that it can both capture more light and produce less noise





NIKON Z 8

Megapixels	45.7MP
Max resolution	8256 x 5504 pixels
Sensor information	Full-frame CMOS (35.9 x 23.9 mm)
Shutter speed	30sec – 1/32,000sec (Electronic)
Native ISO sensitivity	64 - 25,600
Drive speed	20fps (RAW) 30fps (jpeg)
Max video resolution	UHD 8K (7680 x 4320)
Metering options	Center-Weighted Average, Highlight Weighted, Matrix, Spot
Max flash sync	1/200 sec
Connectivity	USB Type-C, HDMI, 3.5mm jack, Wifi, Bluetooth,
Batteries	Rechargeable Li-ion battery pack (EN-EL15c)
Storage	1x SD/SDHC/SDXC UHS-II
LCD	3.2 inch, 2,100,000 Dot 4-Axis Tilting Touchscreen LCD
Viewfinder	0.5in 3,690,000 Dot OLED
Weight	820g (body only)
Dimensions	144 x 118.5 x 83mm

FEATURES

This is a pro camera with plenty of high-end features and functions for the discerning shooter

★★★★★

BUILD QUALITY

The body is built from pro-grade materials, complete with a high level of sealing

★★★★★

HANDLING

It's definitely chunkier than the Z 6/7 series cameras, but DSLR users will love it

★★★★★

QUALITY OF RESULTS

There really isn't much to complain about with regard to image and video quality. It's top-notch

★★★★★

VALUE FOR MONEY

It may be pricey now, but it's a lot cheaper than the Z 9 and the price will only fall further

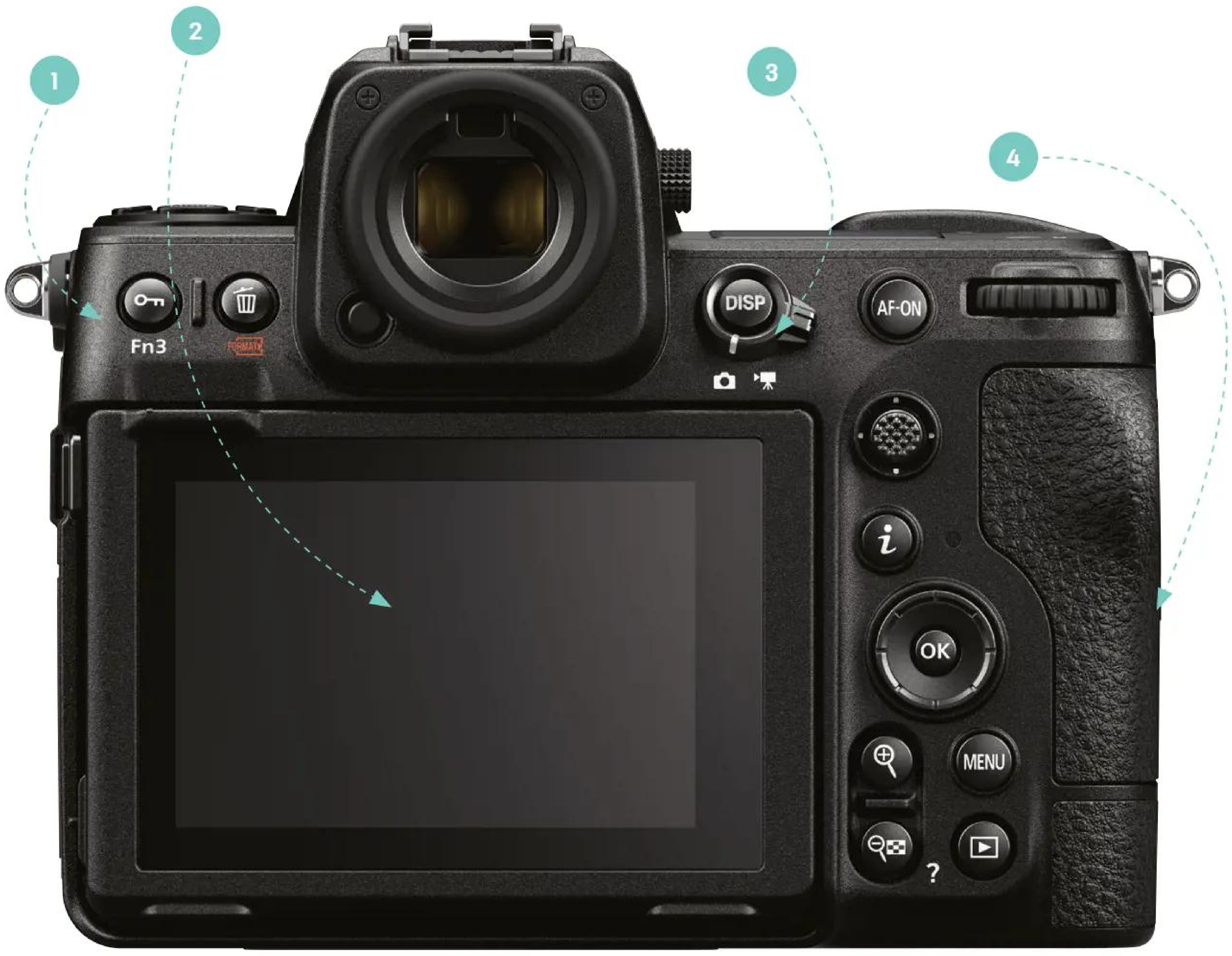
★★★★★

Overall

If you loved the blend of speed, resolution and build quality of the D850 DSLR, then look no further than the Z 8 as a replacement

★★★★★

> *"The Nikon Z 8 is like a Z 9 crammed into a smaller body. It borrows its handling characteristics from the D850"*



① **Smaller design**
Unlike the Z 9, there is no built-in vertical grip, making the Z 8 far more portable.

② **Vari-angle screen**
At the rear is a 3.2in high-res articulated screen, useful for low-level work and vlogging.

③ **DSLR-like handling**
The camera borrows many characteristics from the D850, which should tempt devotees.

④ **Memory card slots**
Nikon has fitted the Z 8 with both CFexpress Type B/XQD and SDXC slots.

Nikon
NIKKOR
Z 24-70mm 1:4 S ø72
NIKKOR S
Z 6II

Nikon Z 6II

£1,999/$1,997 (body only)

The Z 6II makes some interesting updates to the Z 6, but are they enough to tempt owners of the original camera? Angela Nicholson takes a look

CSC www.nikon.co.uk

Nikon announced the Z 6II, along with the Z 7II, as the upgrade to the original Z 6, though both the Z 6 and Z 7 are set to continue in the company's line-up for the foreseeable future.

Inside the Z 6II is the same 24.5MP full-frame (35.9 x 23.9mm) backside-illuminated CMOS sensor that's in the Z 6, but this time Nikon has paired it with not one but two EXPEED 6 processors. This is a central part of the Z 6II's upgrade on the Z 6, and it enables a number of performance enhancements, including a 2fps increase in the maximum continuous shooting rate, taking it to 14fps. That rate can be maintained for up to 200 JPEGs or 124 uncompressed 12-bit RAW files. Those figures might not sound like a big change, but with split-second action, they can make a significant difference.

The extra processing power also enables the Z 6II to have eye detection for humans or animals in video mode as well as stills. That's a useful enhancement for anyone wanting to take advantage of the 4K recording capability.

Interestingly, Nikon hasn't announced any changes to the noise reduction algorithm as a result of the increased processing power, and the sensitivity range of the Z 6II remains the same as its predecessor – ISO 100-51,200, with expansion settings taking it to ISO 50-204,800. However, the Z 6II's 273-point hybrid autofocus system has received some attention, and although all the hardware remains the same, the tracking and low-light AF performance has been enhanced so it can focus in 2EV darker conditions than the Z 6.

Features

Big Mount
The Z6 II has Nikon's Z-mount, which has an internal diameter of 55mm – 8mm wider than the F-mount – which means that more light can reach the sensor.

Dual processors
For the first time, Nikon has put two processing engines in a digital camera. These EXPEED 6 processors bring enhanced performance.

Storage
Nikon has upgraded the Z 6's single card port to dual ports in the Z 6II – one SD-type and one XQD/CFexpress – enabling one to act as an overflow, backup or split storage.

Electronic Viewfinder
The OLED electronic viewfinder has aspherical glass elements and coatings to repel dirt, prevent flare and reduce reflections. It can preview images with or without the settings applied.

More sensitive AF
The Z 6II's 273-point hybrid AF system is sensitive down to -6EV with an f/2 or faster lens, so it should function in the light from a quarter moon.

4K 60p to come
Currently, the Z 6II can shoot 4K UHD (3,840 × 2,160) video at 30p ,but 4K 60p will be added with a firmware update – albeit with a 1.5x crop factor.

BIG MOUNT

In another major upgrade from the Z 6, the Z 6II has two memory card slots, one that can accept SD/SDHC/SDXC media and is UHS-II compliant, and the other that accepts XQD or CFexpress cards. You can set either card slot to be the primary, and the secondary card can be made to act as an overflow or backup, or send JPEGs to one card and RAWs to the other. The extra card slot and the second processor means that the Z 6II is 2mm deeper than the Z 6, which must've been an expensive move for Nikon, but many photographers, especially those who shoot one-off events like weddings, want the reassurance of a second card.

Aside from the slight change in one dimension and a 'II' on the front, the Z 6II's body is indistinguishable from the Z 6. It's made from magnesium alloy, is sealed against dust and moisture, and it feels very solid, with a well-shaped grip.

2
Nikon
24-70/4 S

3
Nikon
NIKKOR
Z 24-70mm 1:4 S ø72
6II

1

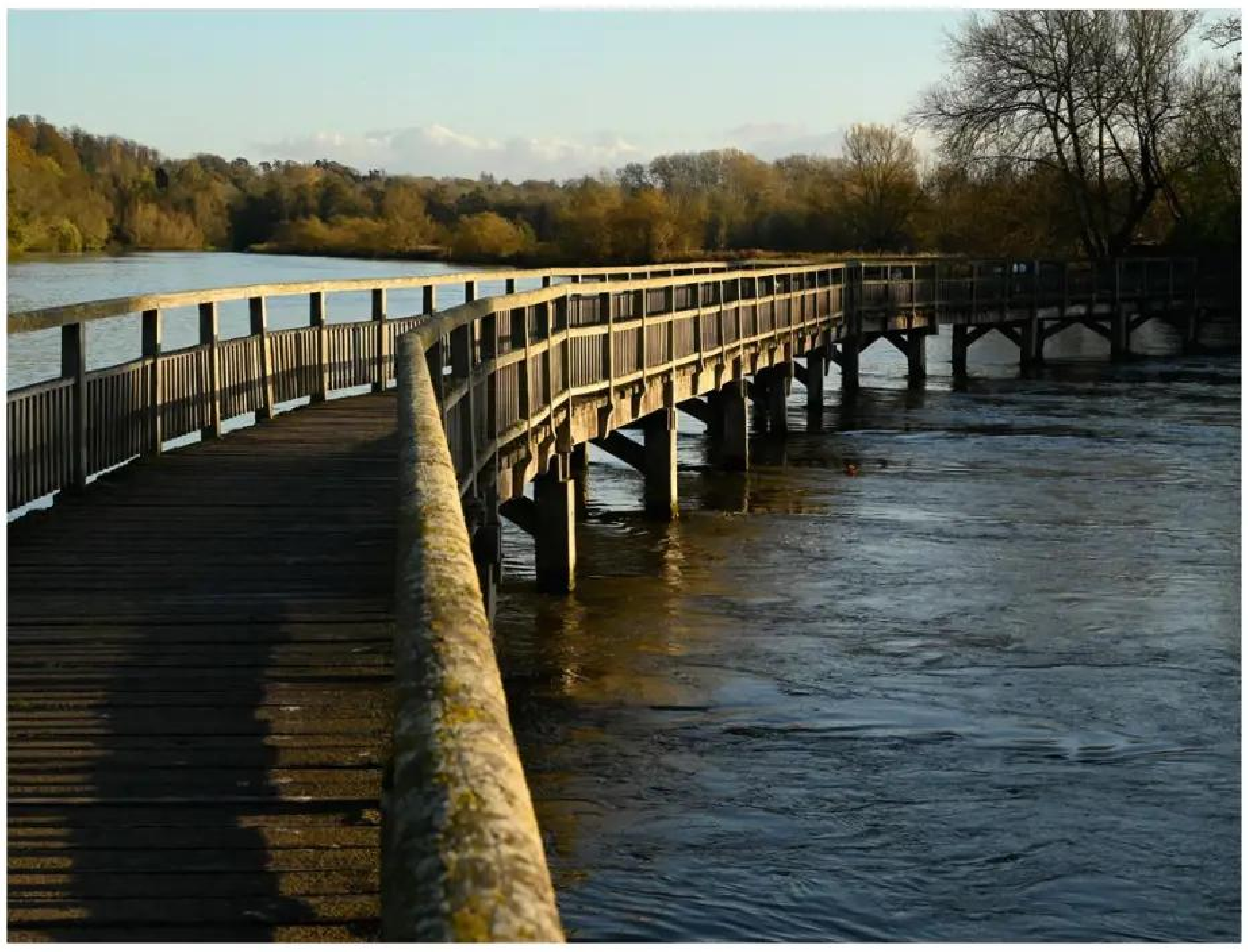
A little deeper
The Z 6 II is 2mm deeper than the Z 6 to accommodate the extra processing engine and card slot.

2

Weather-sealed
All the joints and controls are weather-sealed to the same high standard as the Nikon D850.

3

SnapBridge built in
SnapBridge can be used to update the firmware as well as transfer images automatically to a paired smartphone.



x5 © Angela Nicholson

Above The viewfinder occasionally makes the preview look a bit brighter than it should

Right The AF system is faster, more sensitive and performs better in low light than the Z6's

Left There are three types of Auto White Balance setting, and it's worth seeing which one you prefer in the conditions

A locked mode dial on the top of the camera lets you select the exposure mode quickly, and the dual-dial arrangement enables speedy exposure setting changes. There's also a healthy array of customisable buttons, and the control dial or manual focus ring on Z-series lenses can be customised to adjust a few key settings, such as exposure compensation.

There's an 'i' or Info menu that gives a quick route to 12 of the most commonly used features. Oddly, although the Info menu shows different features depending on whether the camera is set to shoot stills or video, only the stills version of the menu is customisable.

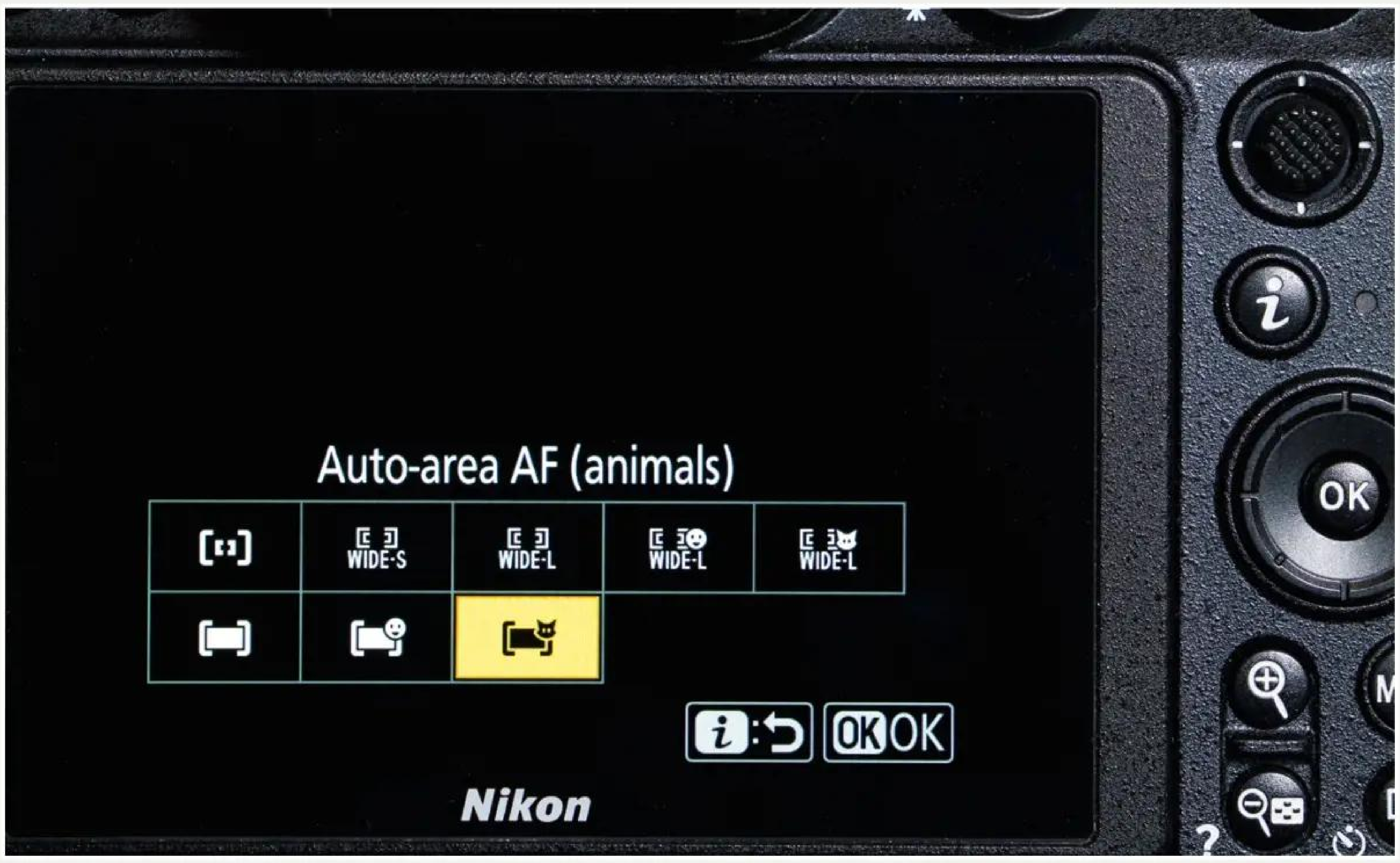
On the back of the camera, the 3.2-inch, 2.1 million-dot LCD can be tilted for easier viewing from above or below head height. It can't be tilted through 180 degrees to be seen from in front of the camera for selfies or vlogging, but it provides a clear view for landscape-orientation photography and videography.

This screen is paired with a 0.5-inch, 3.69 million-dot electronic viewfinder, which is also very good, although recent developments mean that its specification isn't as impressive as it was when the Z 6 was introduced. On most occasions it provides an accurate preview of the scene, but there were a few instances during my testing when the preview looked a bit brighter than the final image.

As soon as we started shooting with the Z 6II it was clear that its autofocus system is more decisive and faster in low light than its predecessor. On the whole it's good, and the tracking AF does a great job of sticking with the subject as it moves around the scene. However, the eye detection system, though useful, lags a bit behind some of the competition – though few manufacturers have introduced animal eye detection for video, and

Eye detection

There are four eye-detection options available on the Z 6II: Wide-area AF (human); Wide-area AF (animal); Auto-area AF (human); and Auto-area AF (animal). And rather than delving into the Custom Setting menu, eye detection can be activated from the Info menu or a customised button. If your subject is under your direction, Wide-area AF mode works well, as you can target where the eyes will be in the frame. However, with most animals, Auto-area AF (animal) makes a better choice. Once that's activated, the camera puts a yellow square around any eyes that it detects in the frame. If more than one eye is detected, you can jump to the one you want to focus on using the joystick on the back of the camera.



provided that the animal concerned (it works with dogs, cats and similar creatures) isn't moving quickly relative to the camera, it does a good job of keeping the eyes sharp.

The image quality from the Z 6II is very good, but keep to ISO 25,600 or lower when possible. Should you need to, low-ISO RAW files can withstand a huge amount of post-capture brightening, up to 5EV without noise, banding or colour becoming problematic.

> "The Tracking AF does a great job of sticking with the subject as it moves around the scene"

NIKON Z 6II

Megapixels (effective)	24.5
Max resolution	6,048 x 4,024
Sensor information	Full-frame (35.9 x 23.9mm) CMOS
Shutter speed	1/8,000 to 30sec, Bulb, Time
ISO sensitivity	100-51,200, expandable to 50-204,800
Exposure modes	Auto, Program, Shutter Priority, Aperture Priority, Manual
Metering options	Matrix, Centre-weighted, Spot, Highlight-weighted
Flash modes	Hot-shoe mounted: front-curtain sync, slow sync, rear-curtain sync, red-eye reduction, red-eye reduction with slow sync, off
Connectivity	Bluetooth, Wi-Fi, SnapBridge, USB-C, HDMI, Audio in and out, Accessory port
Weight	615g body only, 705g with battery and memory card
Dimensions	134 x 100.5 x 69.5mm
Batteries	EN-EL15c rechargeable Li-ion battery
Storage	Dual slot: XQD/CFexpress card and SD/SDHC/SDXC
LCD	3.2-inch 2.1 million-dot tilting touchscreen
Viewfinder	0.5-inch 3.69 million-dot OLED

FEATURES

The crop for 4K 60p will disappoint videographers, but there's plenty to entice photographers

★★★★☆

BUILD QUALITY

Like its predecessor, this is a solid-feeling camera that can survive being used in a rainstorm

★★★★★

HANDLING

Nikon's best handling and control arrangement to date, combining touch, dial and button control

★★★★☆

QUALITY OF RESULTS

Excellent still and video quality in a range of conditions, but the eye detection needs work

★★★★☆

VALUE FOR MONEY

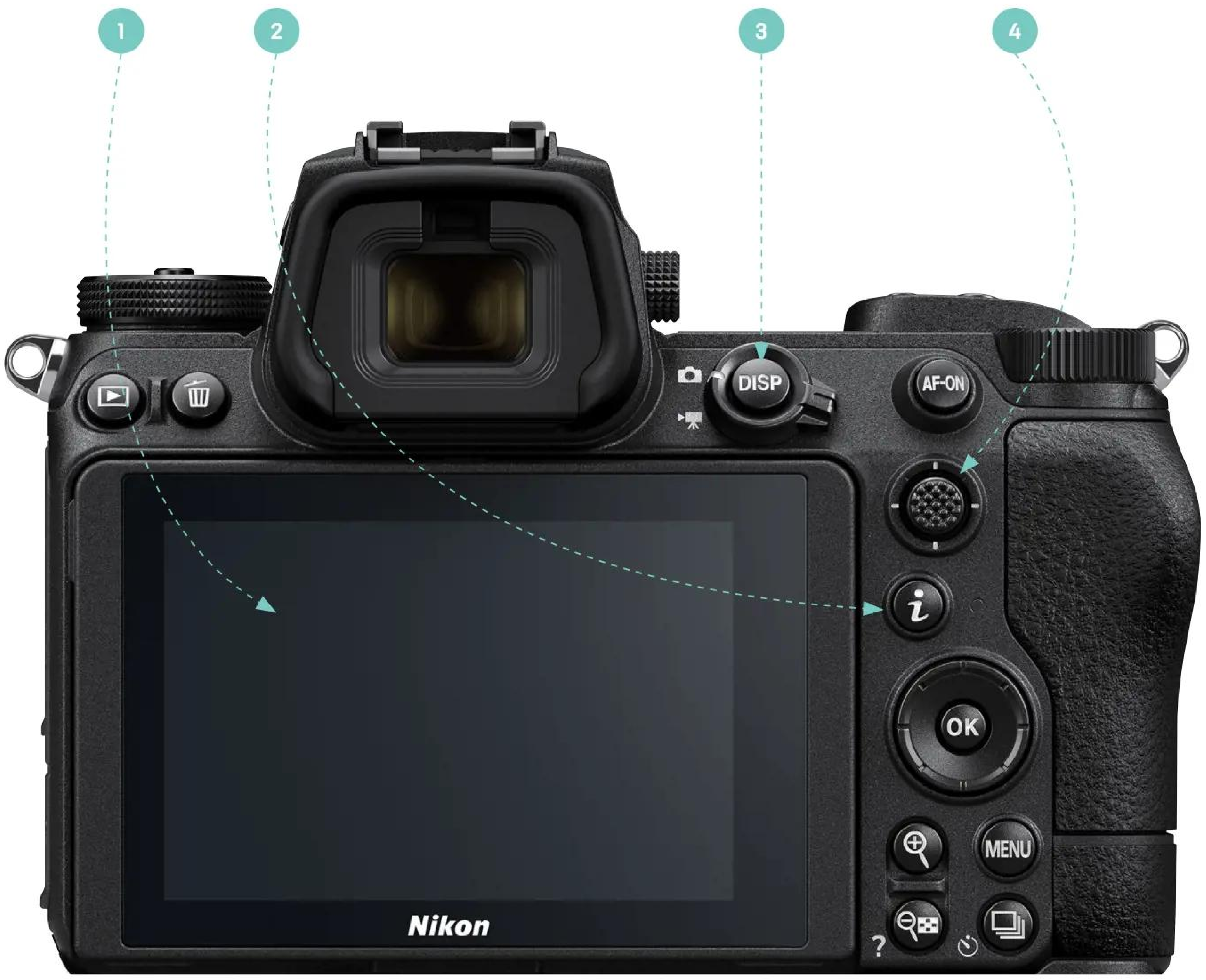
For the price point, the Z6 II is attractively priced for a durable full-frame camera

★★★★★

Overall

The Z 6II builds on the Z 6 with better performance and a second card, but it's more attractive to those switching to mirrorless or full-frame rather than Z 6 users.

★★★★☆



① **Touch-control**
The tilting screen is responsive to touch and speeds up making setting changes.

② **i Menu**
There are two versions of the I menu, one for stills and one for video.

③ **Stills or video**
A flick of this switch takes you from stills to video mode or vice-versa.

④ **Set AF point**
The joystick lets you select the AF point quickly while you're composing images in the EVF.

OLYMPUS
OM-1
OM SYSTEM
1

CSC www.olympus.co.uk

OM System OM-1

£2,000/$2,200

Does OM System's first serious camera deliver enough to keep Olympus photographers on board? Angela Nicholson takes a closer look at the OM-1

The past few years have seen a turbulent period for the camera industry and part of the fallout has been the sale of Olympus's photographic business and its re-emergence as OM Digital Systems under the OM System brand name.

The first camera to come from this brand (we don't count the Pen E P7 as that was from Olympus) still has the Olympus badge. Nevertheless, it's called the OM System OM-1. In case that isn't confusing enough, the OM-1 is the successor to the Olympus OM-D E-M1 Mark III and it takes the OM-D E-M1X's place as the company's flagship camera.

Inside the OM-1 is a 20.4MP Four-Thirds Type stacked, backside-illuminated CMOS sensor. It's the first time that a stacked sensor has been used in a Micro Four-Thirds camera and it's paired with a new TruePic X processing engine, which is three times faster than the previous processor. This combination enables full-resolution shooting at up to 120fps in Sequential Shooting SH1 or Pro Capture SH1 mode. The focus and exposure are locked at the start of the sequence in those modes, but in the Sequential Shooting SH2 and Pro Capture SH2 modes, you can shoot at up to 50fps with continuous autofocus (C-AF) for up to 96 RAW files or 97 Large Fine JPEGs.

OM Digital Systems has also introduced the first Cross Quad Pixel AF system with the OM-1, which means all 1,053 phase-detection points covering the whole image frame are cross-type and more sensitive than linear points. The subject detection modes first seen in the OM-D E-M1X have also been developed and the OM-1 can focus on cars, motorcycles, airplanes, trains, birds and animals, including dogs and cats. That's great news for Olympus users who were unimpressed with the twin-gripped design of the E-M1X and prefer smaller, single-gripped cameras with the option of adding a battery grip.

Olympus introduced some great computation photography features, such

Features

Fully articulated screen
The OM-1's 3-inch 1.62m-dot screen can be flipped and rotated for shooting selfies or vlogging, but it is also helpful for low- and high-level shooting.

New sensor
The OM-1 has a stacked, backside-illuminated sensor with a fast readout speed that means rolling shutter effect isn't an issue.

High-Res Shot mode
The time it takes the camera to process 16 images captured in High-Res Shot mode into one 80MP or 50MP image has been reduced to five seconds.

BLX-1 battery
The OM-1 has a BLX-1 lithium ion rechargeable battery. In CIPA testing, it has a life of 520 images, but lasts longer in real shooting conditions.

4K/C4K 60P 10-bit video
The OM-1 can record 4K 10-bit video at up to 60p and Full HD video at up to 240p with clips of over 30 minutes in duration.

Starry Sky AF
In Starry Sky AF Mode, Speed Priority makes focusing easy, while Accuracy Priority lets you use a tripod and a telephoto lens to pinpoint stars.

NEW SENSOR

2
OLYMPUS
OM-1
OM SYSTEM

as the Live Composite mode that makes it easy to shoot long exposures and capture traffic trails or fireworks; Live ND mode that enables long exposures in daylight without the need for a traditional filter; High Res Shot Mode that sets the camera to shoot a sequence of 16 images that it then composites into much larger files and Focus Stacking Mode for greater depth of field. Thanks to the new processing engine, these modes are now faster and more appealing to use on the OM-1.

While the look and feel of the OM-1 will be familiar to existing E-M1 Mark III users, there are a few changes. The front and rear dials, for example, are now recessed into the body, and it takes a while to get used to their new location. The introduction of a new button also means that the Auto Exposure Lock (AEL) and AF-On controls are now separated. There are also a few less obvious changes, such as the ability to activate Handheld or Tripod High Res

> *"All phase-detection points are cross-type and more sensitive than linear points"*

1

Familiar yet different
There are only a few differences to the control layout compared with the OM-D E-M1 Mark III.

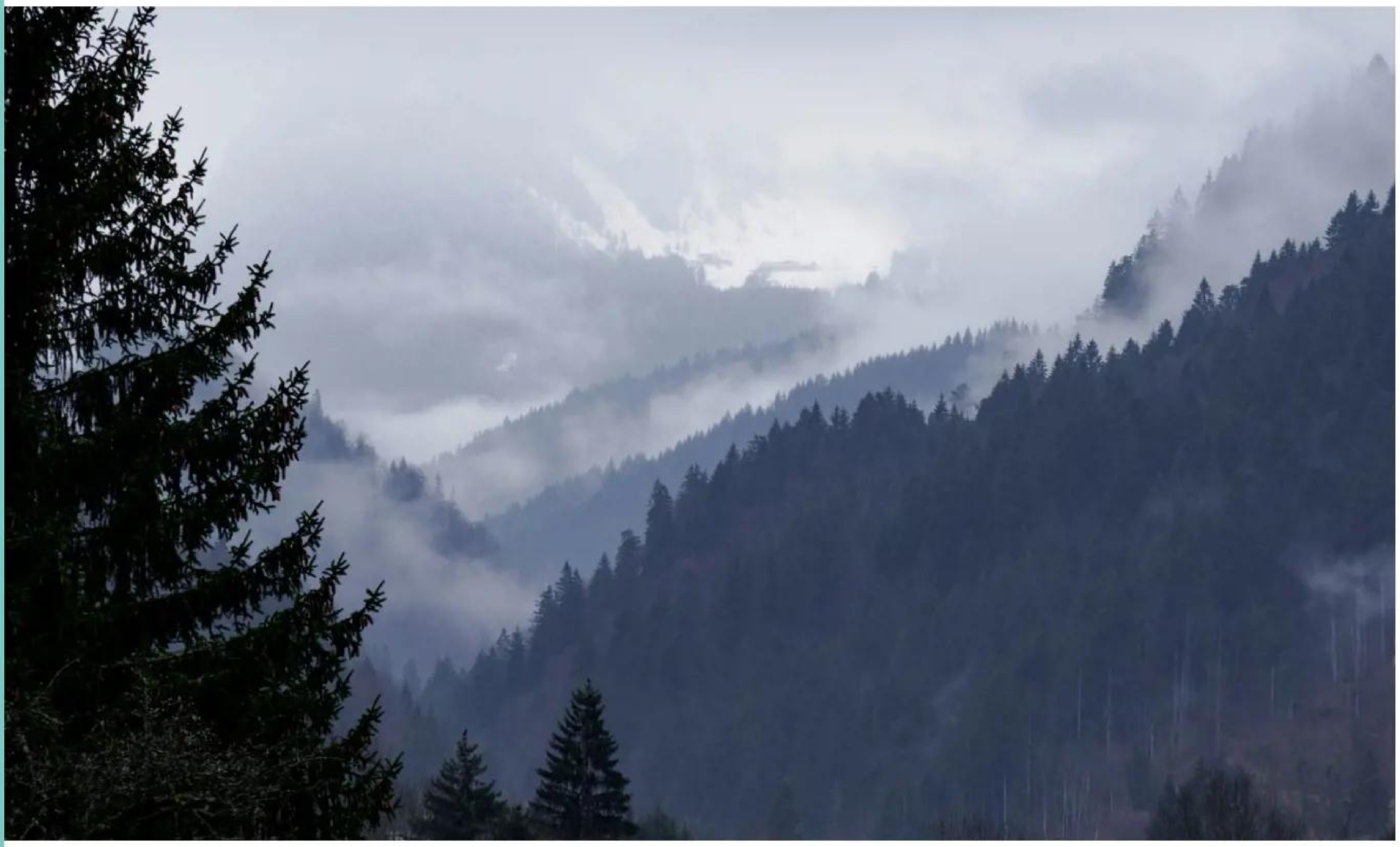
2

Even more weatherproof
The OM-1 has a weatherproof rating of IP53 and can withstand a jet of water.

3

Single-grip
Like the OM-D E-M1 Mark III, the OM-1 has a single-gripped design.

3
OM-1
OLYMPUS
OM SYSTEM 12-40mm 1:2.8 II PRO
M.ZUIKO DIGITAL 12-40mm 1:2.8 ф62



Above Good noise control. Generally, ISO 6400 is a safe maximum value to use but you can get away with pushing higher if necessary

Left The viewfinder can make highlights look brighter than they are but the ESP metering is dependable and the histogram reassuring

Below The subject detection sometimes needs a little help with the targeting, but it's incredibly useful for wildlife, sport and vehicle photography

Shot mode by pressing the video record button in stills mode and rotating one of the dials. The camera also has a neat trick of advising you why a particular feature in the newly rearranged menu is greyed out.

While the OM-1's three-inch vari-angle touchscreen has a relatively modest upgrade to a 1.62-million-dot unit, the viewfinder resolution has been more than doubled in comparison with the OM-D E-M1 III's EVF to a 5.76-million- dot OLED device that's blackout-free. It means there's plenty of detail visible, but in bright light I found that the highlights often look overexposed even though they are fine in the image. The solution is to have faith in the default ESP metering system as it usually gets it right, but keep an eye on the histogram display.

As a rule, I use the Nature Picture mode on Olympus cameras and, on the OM-1, it produces images that are pleasantly vibrant but natural-looking. This dovetails with the Auto-white Balance setting, which copes well with most natural lighting conditions. Detail levels from the OM-1 are excellent for a 20MP Micro Four-Thirds camera and the High-Resolution mode gives a good boost in image size when you need it.

OM Digital Systems claims the OM-1 has two-stops better noise performance than its predecessor and, generally, mid-to-high ISO images look clean. However, you may also see some luminance noise in ISO 200 images if you check them at 100 percent on a computer screen. That said, I also have perfectly usable images that were shot at ISO 25,600, but I'd aim to stick to ISO 6400 or lower.

Subject Detection

The inclusion of the AI subject detection is a crucial addition to the OM-1 that helps put it ahead of the OM-D E-M1X. The subject for detection is set via the menu but it can also be assigned to a button for easier access. As I don't use back-button focusing, I assigned it to the AF-On button. This is particularly useful if you're in a situation where you may want to swap between shooting birds, animals humans or landscapes, for example.

With a clean background, the Subject Detection system generally works well and proved especially good at latching on to birds in flight. However, when the scene is busier, it sometimes needs help and, rather than using all of the available AF points, you need to select a smaller area to give the camera an idea of where the subject is.

With this woodpecker, for example, I selected a box that was just a little larger than its body in the frame before the camera could then hone in on it and focus on its eye.

OM SYSTEM OM-1

Megapixels (effective)	20.4
Max resolution	5184x3888
Sensor information	Four Thirds Type (17.3 x 13.0mm) Stacked BSI CMOS
Shutter speed	1/8000-60Sec plus bulb mode to 30mins
ISO sensitivity	80-102,400
Exposure modes	P, A, S, M, Bulb, Time, HDR, Live Composite
Metering options	ESP, Spot, Centre-weighted, Highlight, Shadow
Flash modes	Auto, Red-eye reduction, Slow synchronisation, 2nd curtain and slow synchronisation, Fill-in for flash, Manual
Connectivity	Wi-Fi, Bluetooth
Weight	599g (incl. battery and memory card)
Dimensions	138.8 x 91.6 x 72.7mm
Batteries	BLX-1 Lithium-Ion
Storage	2x SD/SDHC/SDXC UHS-II
LCD	3-inch 1.62m-dot vari-angle touchscreen
Viewfinder	5.76M-dot OLED

FEATURES
OM Digital Solutions has evolved some excellent innovative features that really shine

★★★★★

BUILD QUALITY
This is a seriously weatherproof camera that you can use in conditions that would see others fail

★★★★★

HANDLING
The control arrangement is good and there are plenty of customisation options to tailor it

★★★★☆

QUALITY OF RESULTS
Natural yet vibrant results in the default settings and great detail levels for the sensor size

★★★★☆

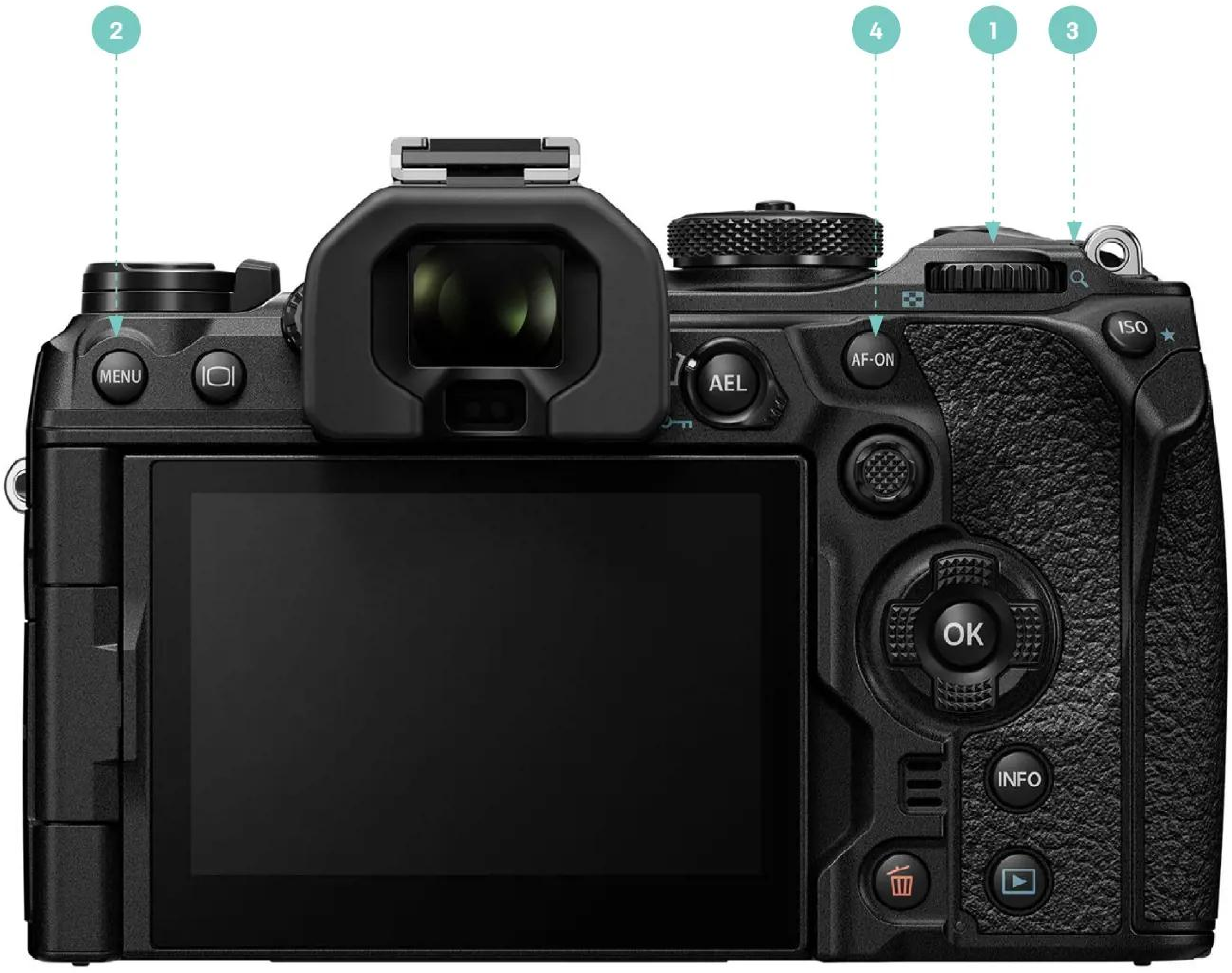
VALUE FOR MONEY
There are a lot of great features and tech packed into the OM-1. It's a versatile camera at a realistic price

★★★★★

Overall
Olympus users can feel reassured by the OM-1. Although some may wish for more pixels, it delivers in many other ways

★★★★★

> *"In bright light, I found the highlights often look overexposed, even though they are fine in the image"*



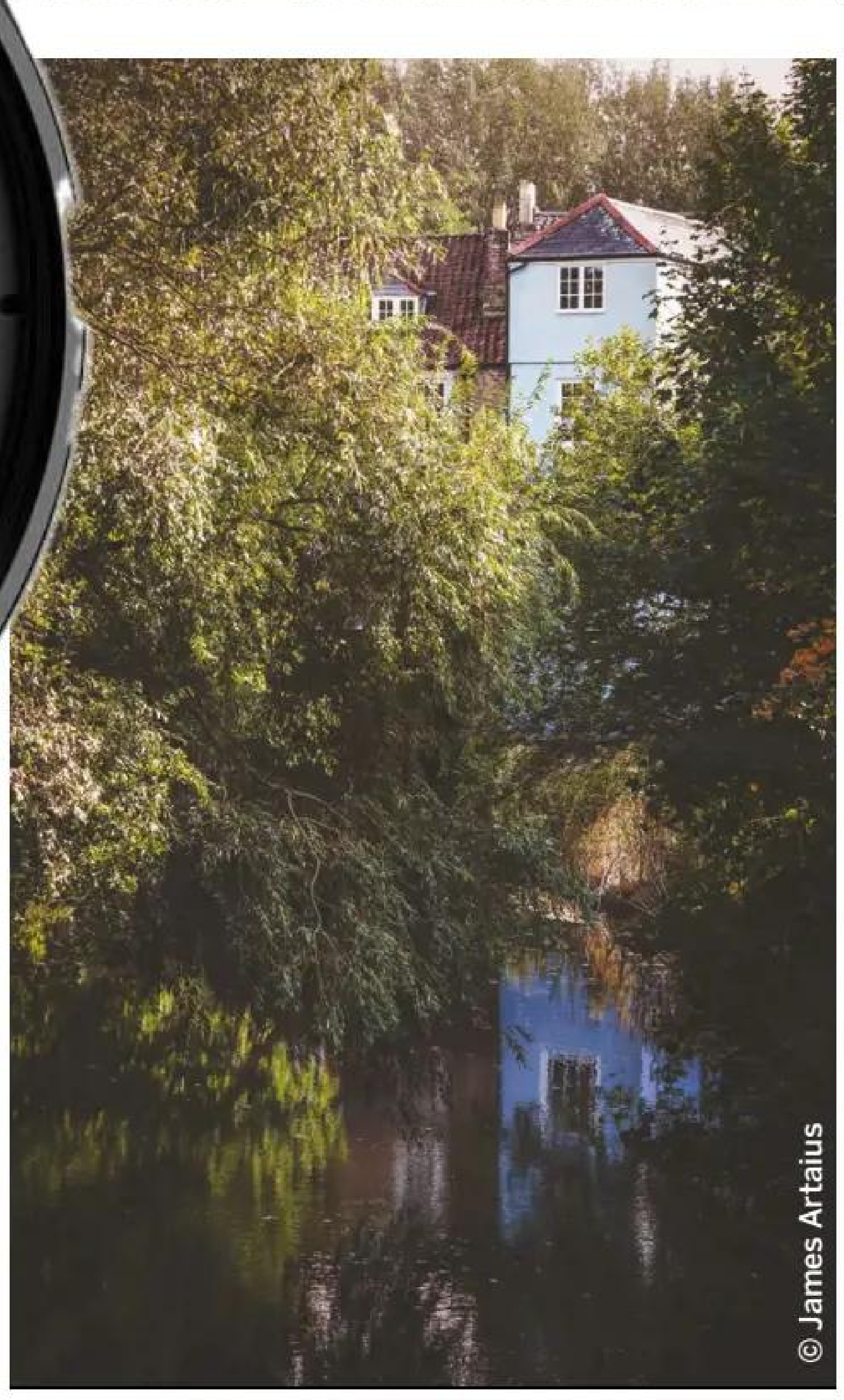
① **New dials**
Unlike the E-M1 Mark III, the front and rear dials are recessed into the camera's body.

② **Rearranged menu**
The new menu groups connected features together and makes options easier to find.

③ **High-Res Shot mode button**
In stills mode, the record button gives access to the High-Res Shot mode options.

④ **SepArate AEL and AF-ON**
A new button means the Auto Exposure Lock (AEL) and AF-On controls are now separate.

OM SYSTEM
OM-5
M.ZUIKO DIGITAL 14-150mm 1:4-5.6
OLYMPUS
φ58



© James Artaius

OM System OM-5

£1,199/$1,199

The branding may have gone, but as James Artaius discovers, it shows that everything great about Olympus lives on better than ever

CSC www.olympus.co.uk

The OM System OM-5 may be the first 'Olympus camera' not to bear the iconic brand name, but the familiar logo is the only thing that's missing here – this is a camera that lives up to the Olympus legacy and expands on it in several worthwhile ways.

The OM-5 is the successor to the Olympus OM-D E-M5 Mark III. It is the manufacturer's 'middle camera', sitting between the flagship OM System OM-1 and the entry-level Olympus OM-10.

This camera is built to deliver many of the flagship's best features in a body that's smaller and lighter. It features the same 20.4MP sensor as the E-M5 Mark III, but it is paired with an updated TruePic IX processor to squeeze even more computational cleverness out of the body.

The OM System OM-5 boasts the brilliant Live ND filters, which offer a software-driven alternative to using neutral density filters up to ND16 (4 stops). This means you can get those silky water shots without the need for filters – or tripod. That's because the in-body image stabilisation has been boosted by 15 percent to 6.5 stops as standard, or 7.5 stops when paired with one of the Sync-IS lenses.

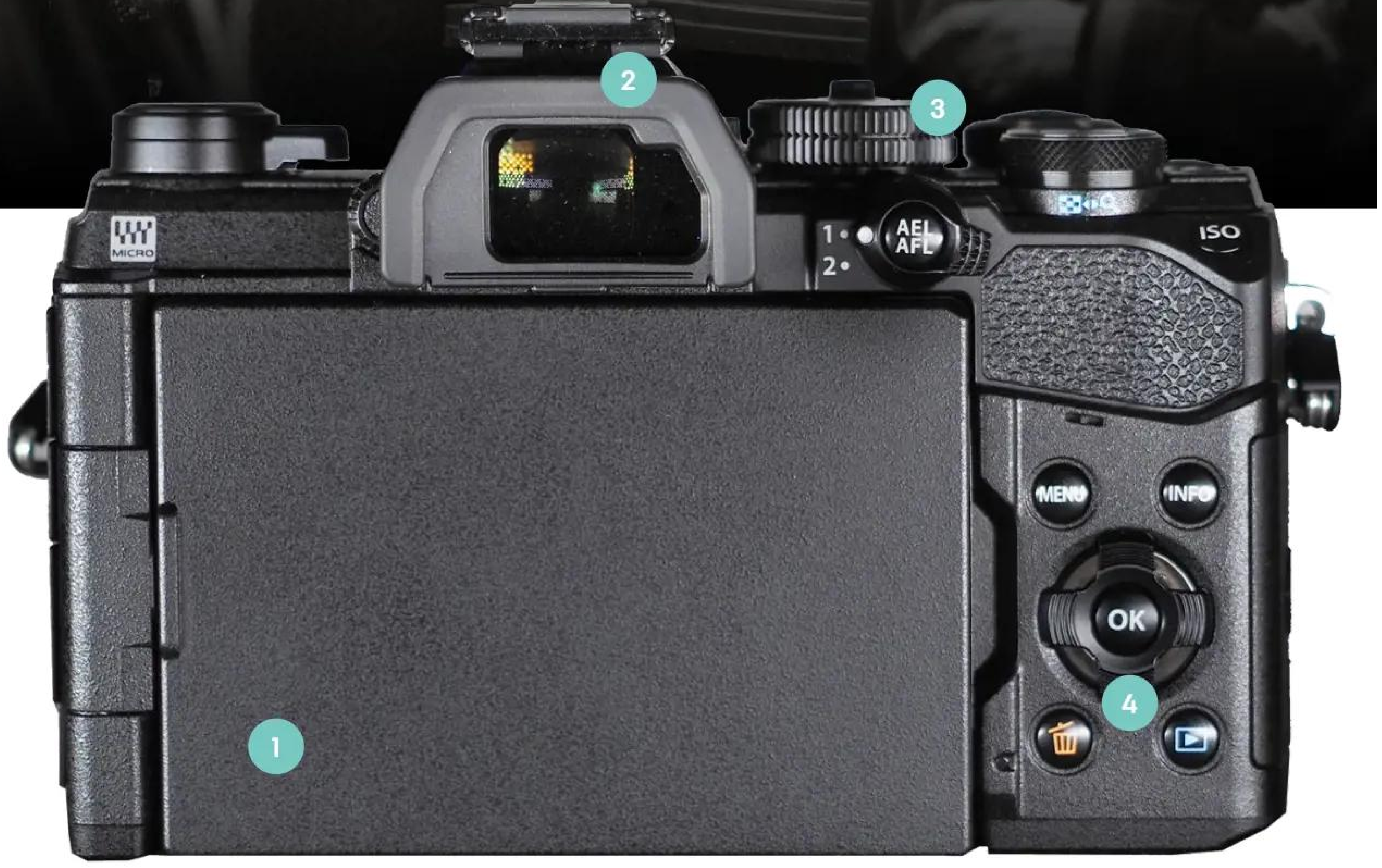
All this feeds into the ethos of this camera: a body that you can take on an adventure, spot a photo opportunity, and still get those great shots without accessories.

Other computational features include the fantastic Pro Capture, which starts recording images when the shutter is half-pressed – meaning you can capture up to 14 images in the moments before pressing the shutter all the way down.

Externally, the OM-5 is identical to the E-M5 III, apart from the change of branding on the pentaprism. You get the same super-compact 125.3 x 85.2 x 49.7mm body that weighs a paltry 366g. You're also getting the same resolution on the EVF and LCD screen, which at 2.36 million dots and 1.04 million dots respectively, are serviceable but nothing too ambitious.

Likewise, the controls and dials, repositioned from the E-M5 Mark II, are all in the same place as they were on the Mark III, with exposure dials, a handily placed ISO button and customisable controls. While the externals may look the same, the 5-series now boasts IP53 weather sealing for the first time, matching the stellar dust and water protection of the flagship OM-1.

While the autofocus in the E-M5 III was great, here we get the benefit of an even



1

Vari-angle screen
As is expected today, the OM-5 features a fully articulated rear LCD.

2

Thin profile
The low body depth makes the camera easy to store in your camera bag.

3

M43 lens mount
The robust lens mount opens up access to a huge range of high-quality optics.

4

No joystick
While control layout is similar to the OM-1, the joystick is only present on the flagship.

OM SYSTEM OM-5

Megapixels	20.4MP
Max resolution	5,184 x 3,888
Sensor information	Micro 4/3 (17.3 x 13.0mm)
Shutter speed	1/8000 - 60s 1/3200 (electronic)
ISO sensitivity	200-25600, 64-25600 (expanded)
Exposure modes	P, A, S, M, Bulb, HDR, Time, Custom
Metering options	ESP, Centre weighted, Spot, Highlight, Shadow
Flash modes	Auto, redeye, Fill, Redeye slow sync, Manual, 2nd-curtain slow sync, Off
Connectivity	Wi-Fi, Bluetooth, USB2, HDMI Micro, Mic
Batteries	BLS-50 lithium-ion
Storage	SD/SDHC/SDXC (UHS-II)
LCD	3" 1,040,000 dot fully articulated TFT LCD touchscreen
Viewfinder	EVF, 2,360,000 dots (1.37× magnfication)
Weight	366g (body only)
Dimensions	125 x 85 x 50 mm

FEATURES
With a wide range of high-end bells and whistles, the OM-5 has plenty to offer the enthusiast
★★★★★

BUILD QUALITY
Despite its small size and weight, the camera body still feels nicely constructed
★★★★☆

HANDLING
It's a little small for big hands, but Olympus devotees will still love the familiarity
★★★★☆

QUALITY OF RESULTS
There are no surprises in terms of image quality. It has impressive dynamic range and noise control
★★★★½

VALUE FOR MONEY
The price puts it in line with the competition, and you get plenty of camera for your cash
★★★★★

Overall
The OM System OM-5 from Olympus is the perfect daily driver when you want to go on an adventure with a camera that doesn't compromise on image quality.
★★★★½

more advanced AF system. The improved face and eye detection make street photography a breeze – locking on quicker and faster, even with side-on faces that often trick autofocus systems. The Starry Sky AF takes the guesswork out of manually focusing when shooting astrophotography. Combined with the stellar stabilisation, it is feasible to shoot handheld starscapes.

That stability is also supremely useful for video, producing gimbal-like smoothness. There is no longer a limit to the recording time, footage can be captured in OM-Log400 if you want to grade your footage later, and vertical video can now be captured for sharing on social media.

In terms of image quality, the OM-5 manages to capture around 1EV more dynamic range than the E-M5 III at lower sensitivities, even at ISO 6400 and above. It is capable of resolving comparable amounts of fine detail as its Olympus predecessor, as well as the 24MP Canon EOS R10.

The OM-5 is a magnificent midrange camera that offers flagship features and all-purpose performance in a compact, affordable package. It has been criticised in some quarters for not offering the same sea change as the OM-1, but for our money, this offers the OM-1's coolest tricks in a much more pocketable body.

> *"Externally, the OM-5 is identical to the E-M5 III, apart from the change of branding"*

Features

M43 Mount
The OM System OM-5 has the Micro Four-Thirds lens mount and is back-compatible with a range of lens options that open new perspectives.

TruePic IX processor
Although the sensor resolution remains the same, it features the latest processing engine, with faster throughput and feature support.

20.4MP sensor
This keeps noise levels well-managed and can be boosted through the Handheld High-Res mode, combining frames for up to 80MP with a tripod.

IBIS
The OM-5's in-body image stabilisation has been boosted by 15 percent to 6.5 stops as standard, or 7.5 stops when paired with one of the Sync-IS lenses.

Video features
The OM-5 allows for unlimited recording time and offers OM-Log400 to capture a flat image, which is useful for pro-level videography work.

Live ND filters
These software-based filters enable shutter speeds up to 4-stops longer than otherwise possible, without the need of adding extra hardware.

OM-5
M43 MOUNT

CSC shop.panasonic.com

Panasonic Lumix GH5 II

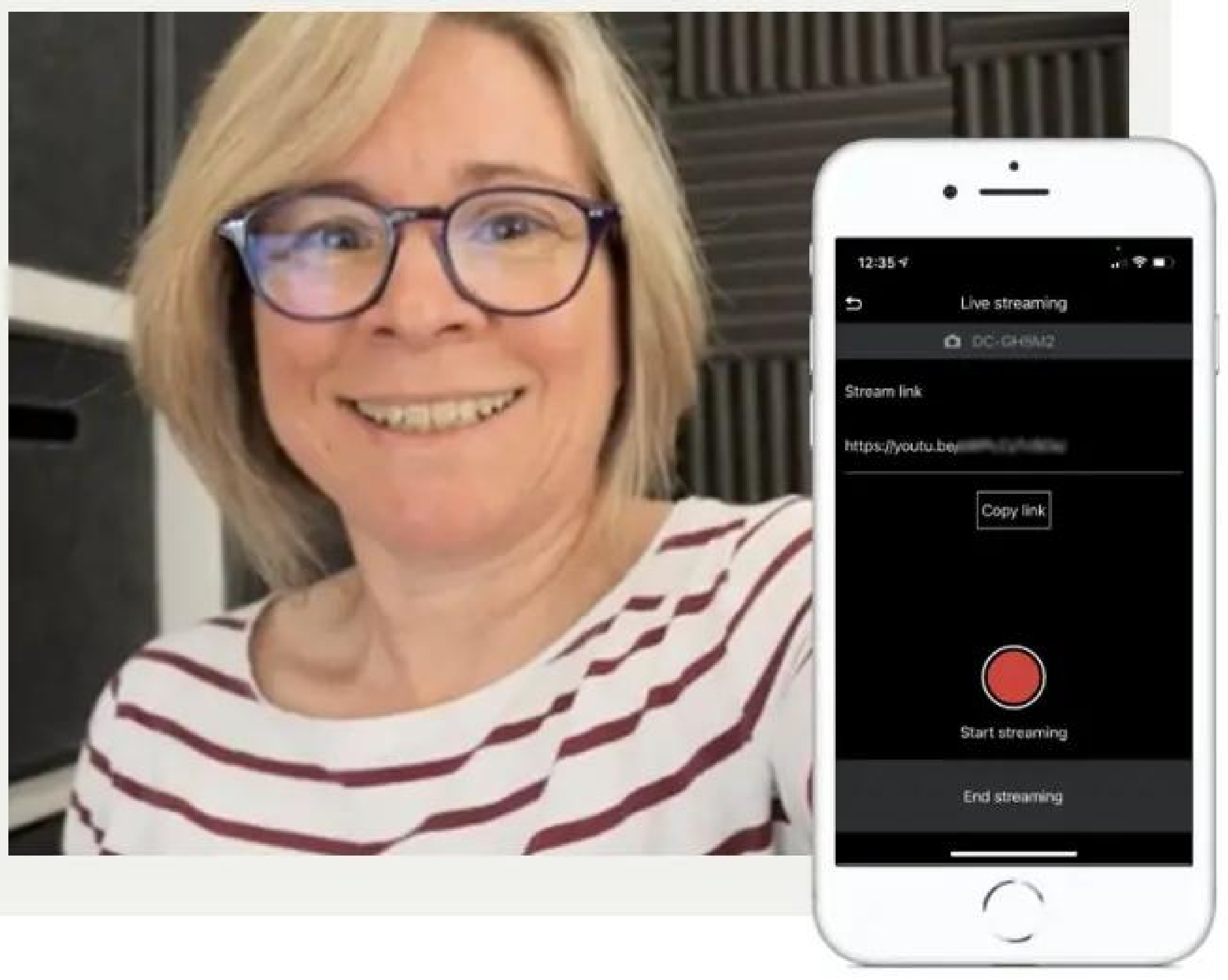
£999/$1,299 (body only)

It may be a light refresh of the GH5 but the GH5 II still offers some impressive features for modern content creators

Live streaming

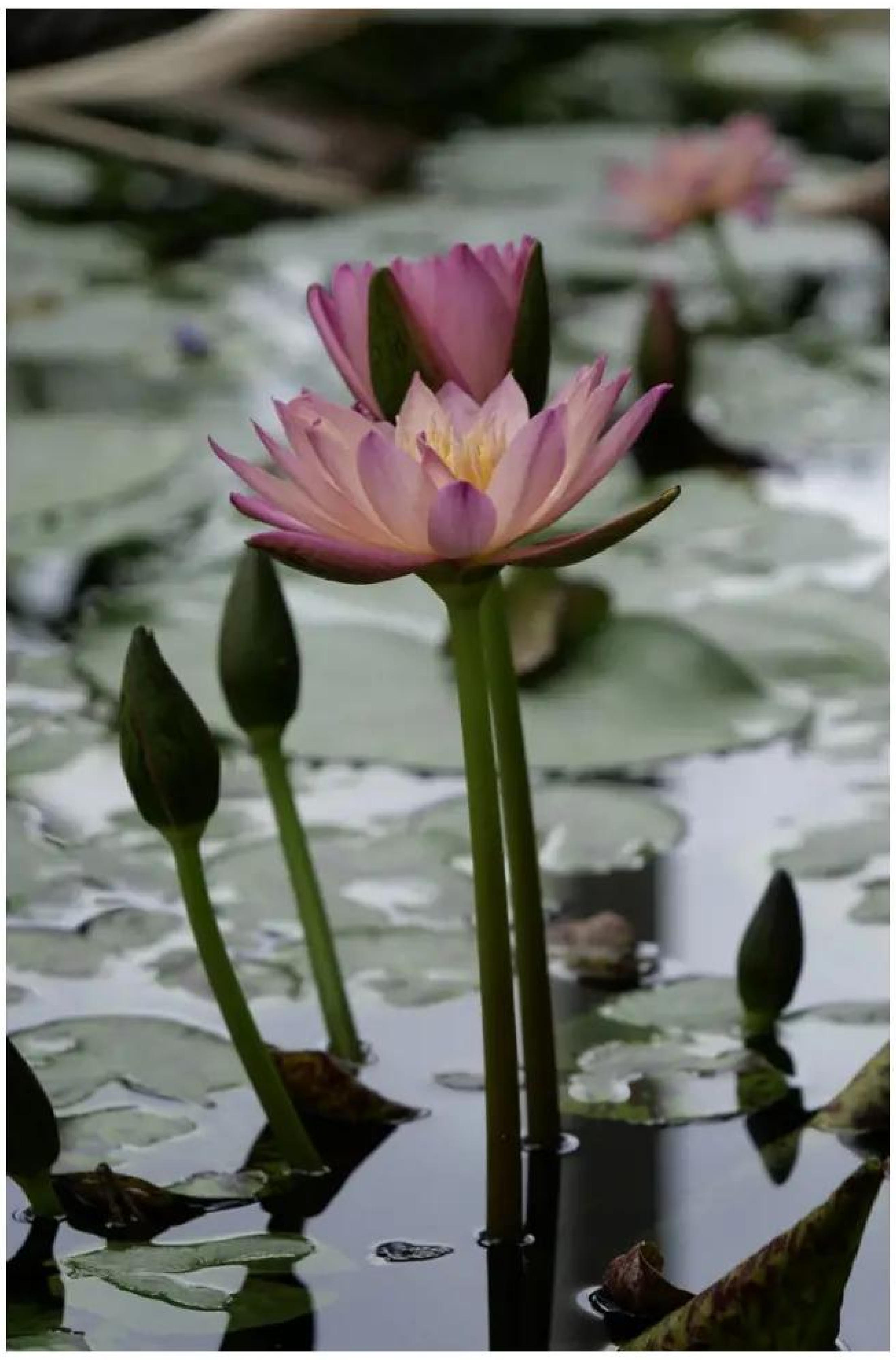
The GH5 II makes it easy to stream via a smartphone

Once you have Panasonic's Lumix Sync app on your phone, it may take a couple of attempts to pair it with the GH5 II and get the Wi-Fi connectivity working, but from then on, it's easy to stream to Facebook or YouTube or via RTMP/RTMPS to your preferred URL using a stream key. The phone doesn't show an image of what is streamed, it merely starts and stops the streaming while the camera's screen can be flipped forward so you know what's broadcasting.



Below Depth of field: At f/4 on the Leica DG Vario -Elmarit 12-60mm f/2.8-4.0 ASP at 60mm, a subject can be isolated through shallow depth of field with a Four Thirds sensor

Right Vari-angle screen: The GH5 II's vari-angle screen is a bonus for creative photography (in landscape or portrait orientation) as well as videography and vlogging or live streaming



Panasonic's GH-series of Micro Four Thirds cameras have been popular with keen videographers and are also very capable stills cameras. The GH5 II upgrades the GH5 and is aimed at photographers, content creators, live-streamers and YouTubers – people serious about their photography and video creation. However, the company has stated that the GH6 is in development and will sit above the GH5 II, aimed at filmmakers who need high-end video features in a small camera body.

Although the GH5 II has the same 20.3MP sensor as the GH5, it has a new AR (Anti-Reflective) coating to reduce flare and ghosting and it's paired with the Venus Engine 10 processor that's found in the full-frame Panasonic Lumix S1H. This more powerful processing engine enables the GH5 II to capture 10-bit 4:2:0 C4K (4,096 x 2,160) video at up to 60fps and 200Mbps or 10-bit 4:2:2 4K (3,840 x 2,160) at up to 60fps and 400Mbps. There are also 4K and 6K anamorphic modes and V-Log L is pre-installed so there's no extra charge for a software upgrade code.

Notably, the GH5 II doesn't have the ability to shoot RAW video. However, the GH5 II has enhanced live streaming capability and can stream via a wired or wireless connection to a router or a smartphone running Panasonic's Lumix Sync app. There's a firmware update promised by the end of the year to enable wired RTP/RTSP streaming.

Panasonic has persisted with a 225-point contrast-detection autofocus (AF) system with its DFD (depth-from-defocus) technology for the GH5 II, but it gains Head/Body/Animal AF on top of the GH5's Face/Eye detection. Although phase detection is generally deemed faster, the GH5 II's AF system is pretty quick and it can be used with fast-moving subjects. The detection system also does a good job of spotting its target, but it also sometimes sees heads or bodies where there aren't any.

Like the GH5, the GH5 II can shoot at up to 12fps in single AF mode and 9fps in continuous AF mode, but its burst depth is much greater at 108+ RAW or RAW and JPEG files or 999+ JPEGs.

Unusually, Panasonic has downsized from a 3.2-inch screen on the GH5 to a 3-inch unit on the GH5 II, but it has increased the resolution from 1,620,000 dots to 1,840,800 dots. A larger screen would be nice, but the GH5 II's vari-angle monitor gives a good view and it's not too badly affected by bright sunlight.

The GH5 II's viewfinder is the same 3.68-million-dot electronic finder as is on the GH5. In the default settings it looks slightly brighter and less saturated than both the scene and the final image. In some cases, this led me to dial in an extra 1/3EV negative exposure compensation unnecessarily, so it's worth adjusting the brightness and saturation of the viewfinder to get a more accurate preview.

The GH5 II's body is made from magnesium alloy and it feels solid and durable. However, it's also very big for a Micro Four Thirds camera; there are smaller full-frame mirrorless cameras like the Nikon Z7 II and Z6 II or any of Sony's A7-series. Some will see that as a plus point as the grip is pretty big and chunky, while others prefer a more compact camera.

Panasonic has been reasonably generous with the number of controls on the GH5 II's body and as well as a lockable mode dial, there's a dial to select the drive mode, a switch to select the focusing mode and dedicated buttons to access the white balance, ISO and Photo Style. Also, most of the buttons are customisable, so they can be set

LUMIX
GH5 II
LEICA
DG VARIO-ELMARIT 1:2.8-4.0/12-60 ASPH. ⌀62
LVF
AF ON
ON OFF
POWER O.I.S.

to access the features you use the most often.

There are dual dials for adjusting exposure, but the default setting requires a dedicated button to be pressed before the exposure compensation can be adjusted. This can be changed via the 'Dial Set' options in the menu.

On the back of the GH5 II, there's a rubberised joystick for shifting the AF point around when you're looking in the viewfinder. This is pleasantly 'grippy' and the control is very responsive, but those with small hands may find it a bit of a reach for their thumb.

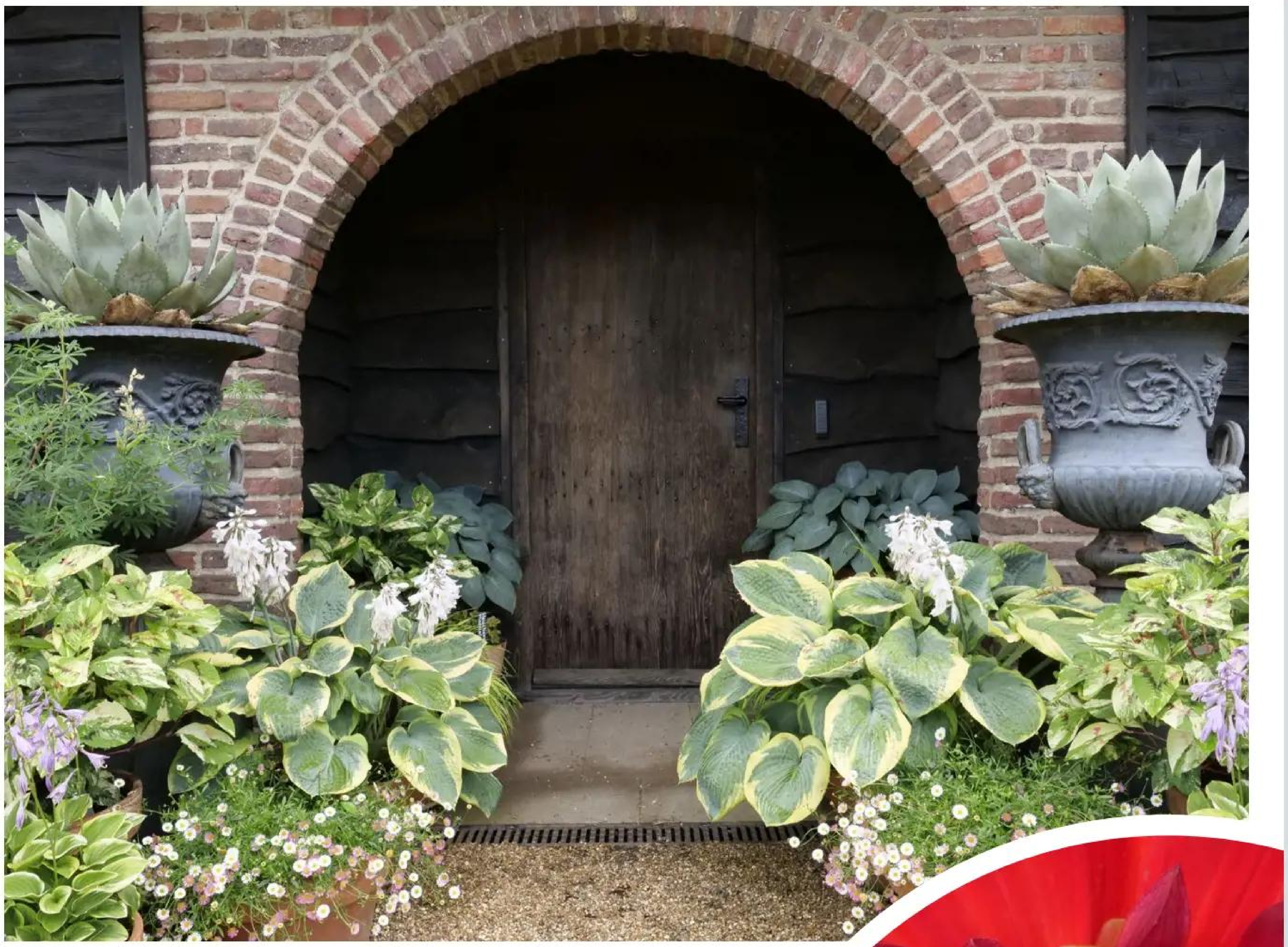
On the image quality front, the GH5 II delivers the goods with plenty of detail and natural colour. However, the highest sensitivity setting (ISO 25,600) is a stop too far as the JPEGs can look rather splodgy while the RAW files have a coarse texture.

Summary

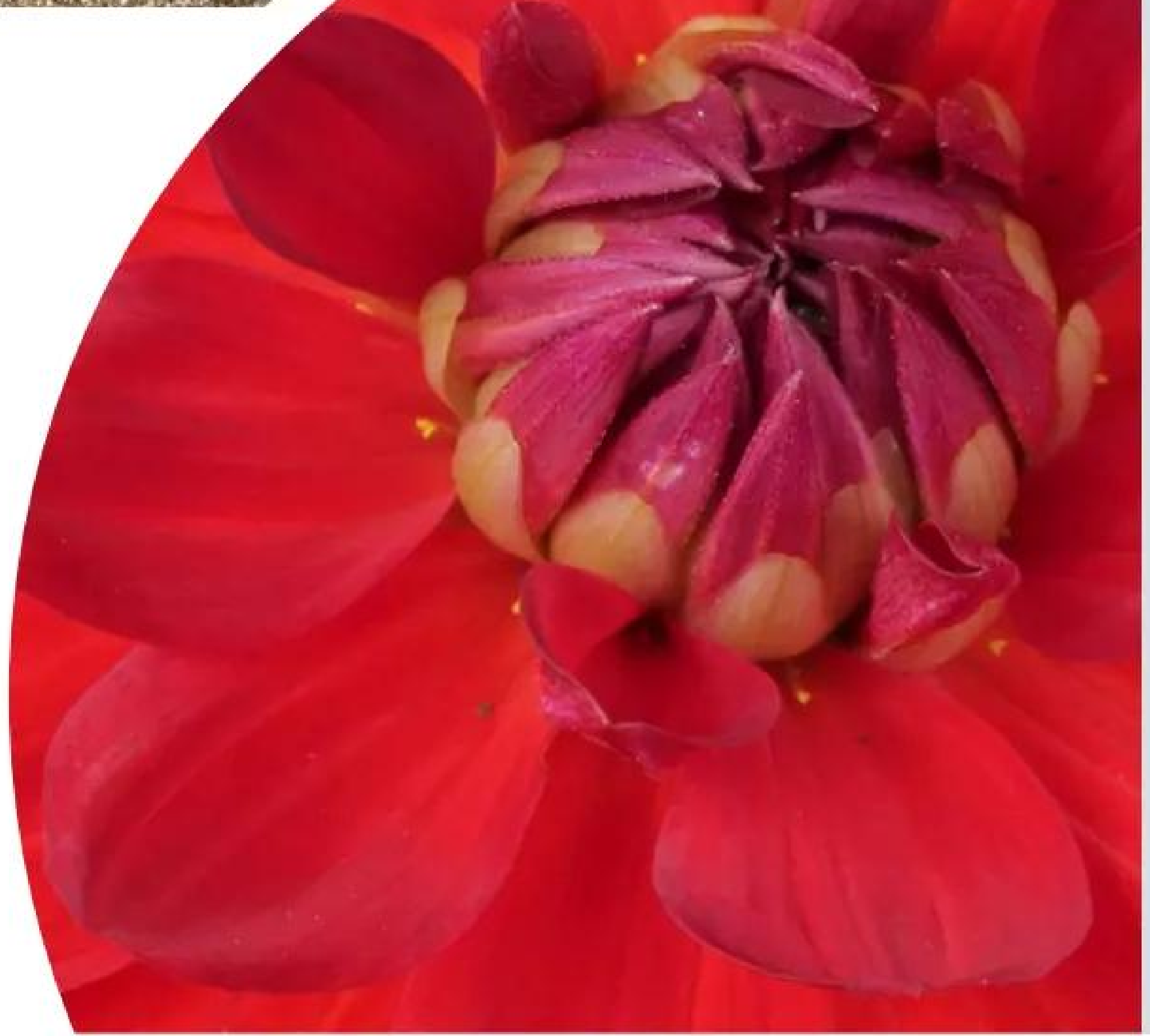
Ease of use	★★★★☆
Value for money	★★★★★
Features	★★★★☆
Quality of results	★★★★☆

Overall ★★★★☆

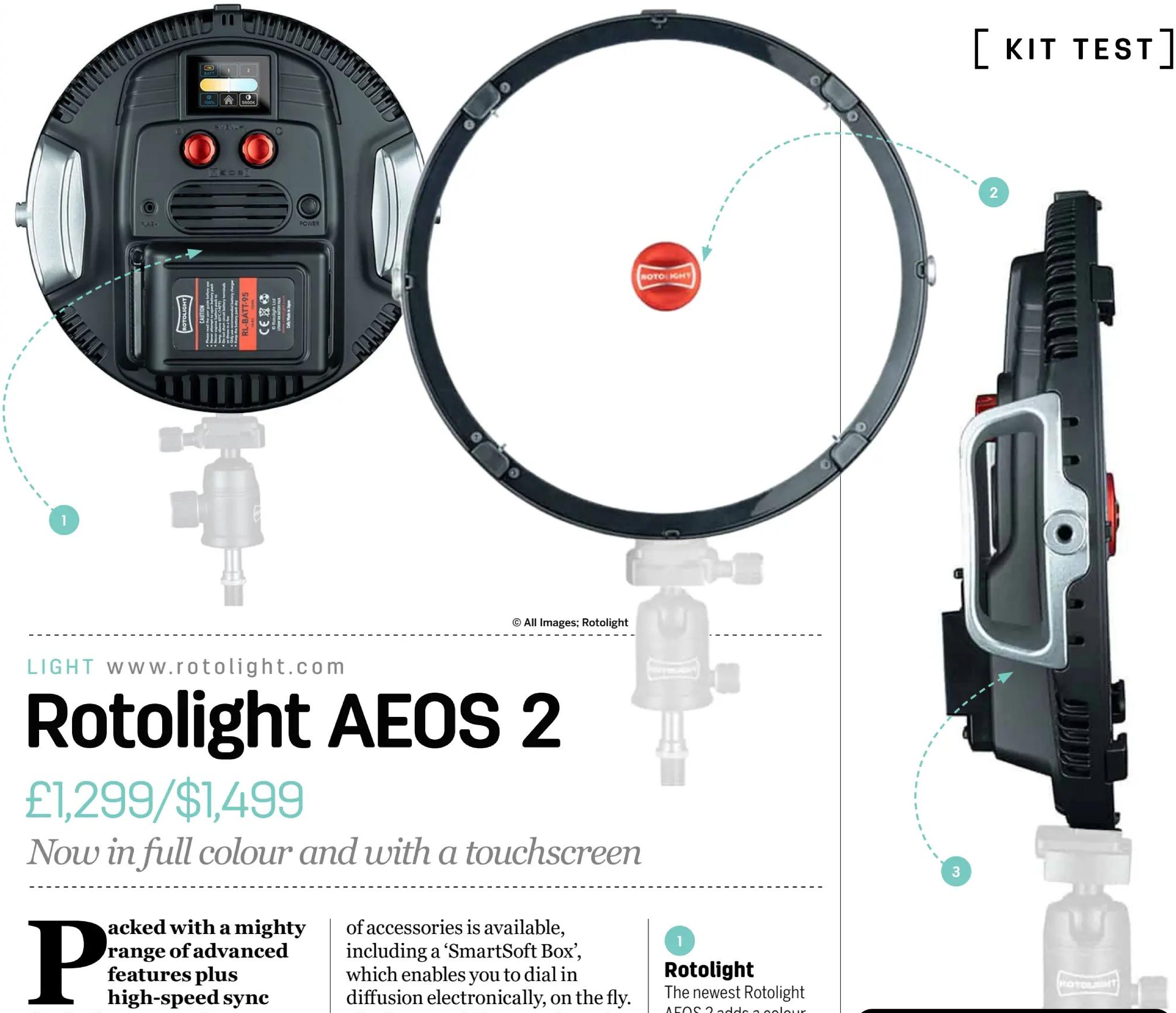
It may not have a headline-grabbing resolution or the largest sensor but the GH5 II is solidly built, and packs a lot of punch with a great range of video and stills features.



Above Balance exposure: In the default Multiple setting, the 1,728-zone multi-pattern sensing metering system on the GH5 II does a good job of balancing the exposure across the frame in a variety of lighting situations



Right Great colour: Reds can be tricky but the GH5 II has handled them extremely well here. The fine details are also resolved clearly to create a natural-looking image



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LIGHT www.rotolight.com

Rotolight AEOS 2

£1,299/$1,499

Now in full colour and with a touchscreen

Packed with a mighty range of advanced features plus high-speed sync flash, the AEOS 2 is a compact and lightweight, yet fully pro-grade build. The original AEOS was a favourite of many enthusiast and professional photographers and videographers, but the second edition takes everything to a whole new level.

Build & handling

The AEOS 2 has a high-grade feel to its construction, with excellent build quality throughout. A neat handling enhancement that's retained is the aluminium grab handles at either side of the rear panel, making it easy to hold and manoeuvre the lamp during on-the-move video sequences.

With mobility in mind, the AEOS 2 is refreshingly lightweight for such a powerful lamp. The battery itself is a V-lock 24V 150W Li-ion type and you can also power the AEOS 2 directly from the mains, via a PSU (power supply unit). A range of accessories is available, including a 'SmartSoft Box', which enables you to dial in diffusion electronically, on the fly. The fitment of a large variety of other modifiers is enabled by Rotolight's optional Bowens S-mount and Universal Speedring adaptors. Arguably the biggest enhancement to handling, is the colour touchscreen panel that makes the wide range of CCT, HSI, gels, flash, special effects and user-defined presets quick and easy to access and adjust.

Performance

For an LED lamp with a 295mm diameter and slim 25mm or 1-inch depth, the maximum power output of 11,500 Lux at 3 feet is highly impressive. This increases to 17,500 in flash mode. Performance is similarly superb in terms of colour accuracy, the TLCI (Television Lighting Consistency Index) rating increasing to 99/100, compared with an already very good 91 in the original AEOS.

1

Rotolight

The newest Rotolight AEOS 2 adds a colour touchscreen, perfect for intuitive and speedy control.

2

Colour Range

Gone are the bi-colour LEDs of the original AEOS, replaced by a bank of top-end RGBWW (Red Green Blue White Warm white) lamps. This makes a full 16.7 million colour range available.

3

Bluetooth

The AEOS 2 also adds built-in Bluetooth and Wi-Fi to control the full range of functions from the companion iOS and Android app.

SPECIFICATIONS

Max output (constant) _ 11,500 Lux at 3 feet
Max output (flash) _ 17,500 Lux at 3 feet
CRI/TLCI _ 95/99
Beam angle _ 50 degrees
Wireless control _ Wi-Fi, Bluetooth
Power consumption _ 120W
Battery type _ V-lock 24V 150W
Dimensions (dia x depth) _ 295 x 25mm
Weight (excl battery) _ 2,400g

WE SAY...

As an all-in-one solution, the AEOS 2 packs enormous constant lighting and flash versatility with real power into a compact and lightweight build, making it a real winner.

VERDICT

FEATURES	★★★★★
BUILD & HANDLING	★★★★★
PERFORMANCE	★★★★★
VALUE	★★★★☆
OVERALL	★★★★★

THIS COMPLETE GUIDE WILL SHOW YOU HOW TO GET THE MOST FROM YOUR CAMERA

Teach yourself Photography explains all the photography concepts beginners need to know, such as how to balance exposures, how to get sharp shots, and how to maximise image quality.

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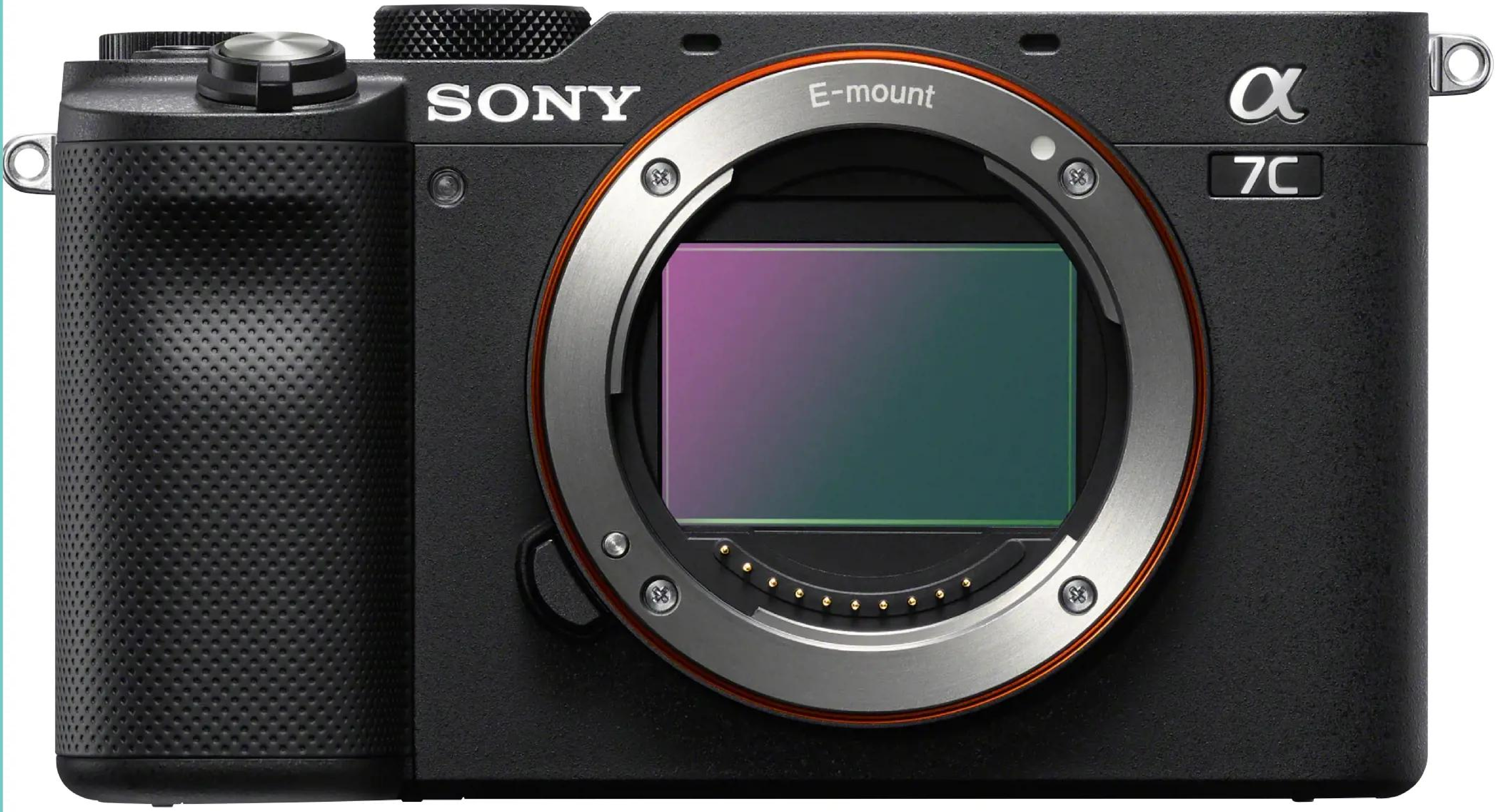


Sony A7C

£1,709/$1,798

A small, full-frame camera with great focusing – could this be the camera we've been longing for?

CSC www.sony.co.uk

x3 © Angela Nicholson

According to Sony, the A7C is the world's smallest and lightest full-frame camera with optical image stabilisation and a zoom lens. And indeed, the A7C isn't much bigger than the APS-C format Sony A6600. It also has a similar rectangular design, with the viewfinder in the left corner of the body rather than protruding from the centre of the top plate.

Inside the A7C is a 24.2MP full-frame Exmor R CMOS sensor with a front-end LSI and a Bionz X processing engine. This enables 16-bit image-processing and 14-bit RAW output, with a standard sensitivity range of ISO 100-51,200 (expandable to 50-204,800). There's also a maximum continuous shooting rate of 10 frames per second with continuous autofocusing and metering.

Being a Sony camera, the A7C is also reasonably well-specified on the video front and is capable of recording 4K (3,840 x 2,160) 4:2:08-bit video at 30p/25p and 100Mbps/60Mbps. There are also S-Log3 gamma profiles to enable 14 stops of dynamic range, and HLG Hybrid Log Gamma for direct HDR movie playback on compatible screens. Full HD (1,920 x 1,080) video can also be recorded at up to 120p for slow-motion playback, and there's a Slow & Quick mode for recording slow or quick-motion footage in camera at rates from 1fps to 120fps.

Unlike the A6600, the A7C has a vari-angle screen that can be flipped out and rotated to make it visible from in front of the camera. That makes it useful for selfies and arm's-length vlogging. However, it's a little frustrating to find that Sony has again limited the level of

Features

Exposure Compensation
A dedicated dial from -3EV to +3EV in 1/3EV steps makes adjusting exposure compensation easy. It can also be set from -5EV to +5EV via the menu.

Real-time Eye AF
Real-time Eye AF is available for humans and animals when shooting stills, and humans in video. With continuous focusing selected, eyes are tracked around the frame.

Weather-sealed
The monocoque design and seals around the inputs and controls make the A7C weather and dust-proof, which is reassuring.

4K Video
4K (3,840 x 2,160) video can be captured using full-pixel read-out and 6K oversampling, for better image quality with lower moiré patterning and smoother edges than standard 4K footage.

740-shot battery
The A7C uses Sony's NP-FZ100 battery, which enables up to 740 images to be captured on a single charge when the screen is used to compose shots.

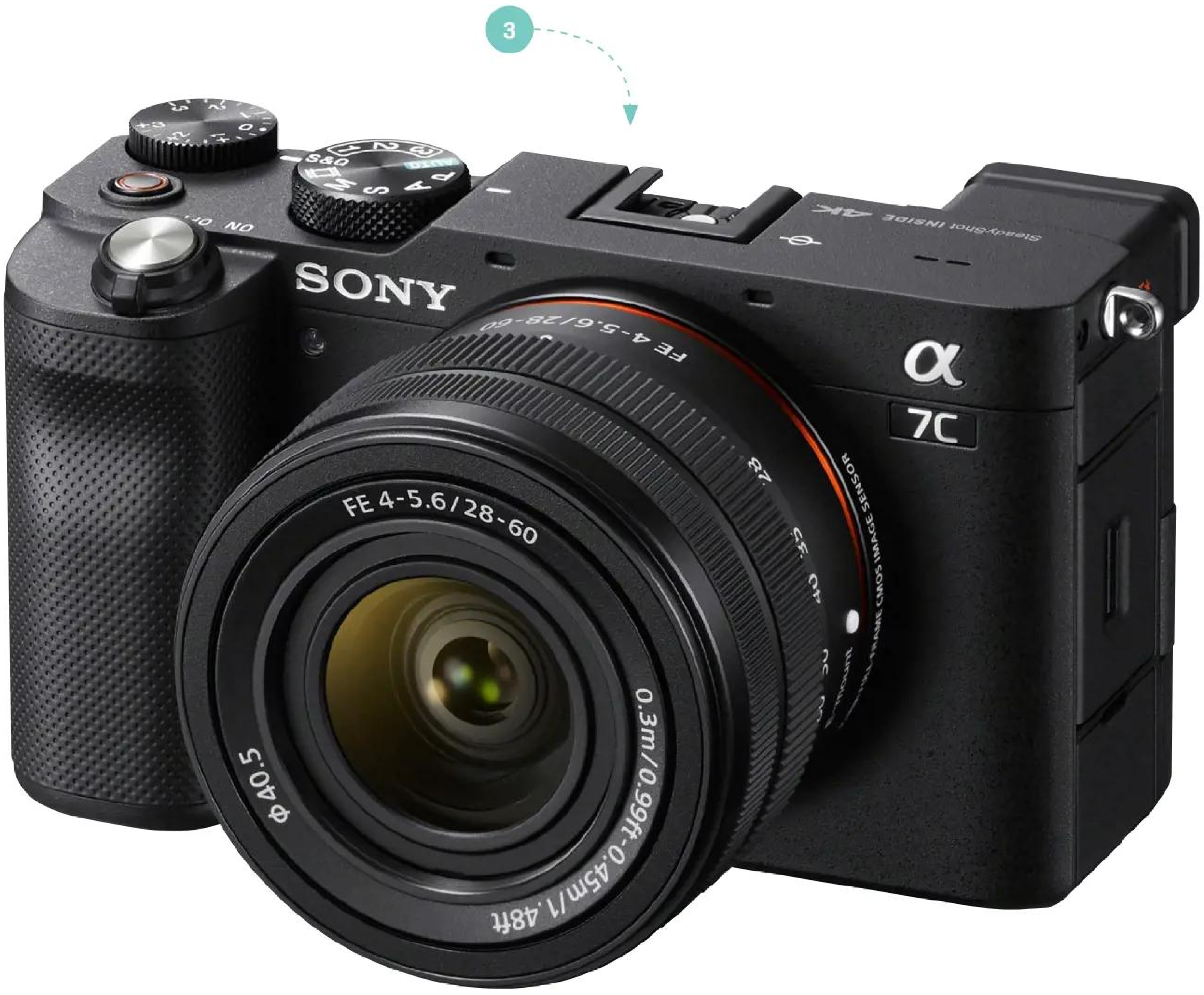
Multi Interface
The A7C's hotshoe has a multi-interface design that enables a range of accessories to be connected, such as a Sony ECM-B1M shotgun microphone or an XLR-K3M XLR adapter.

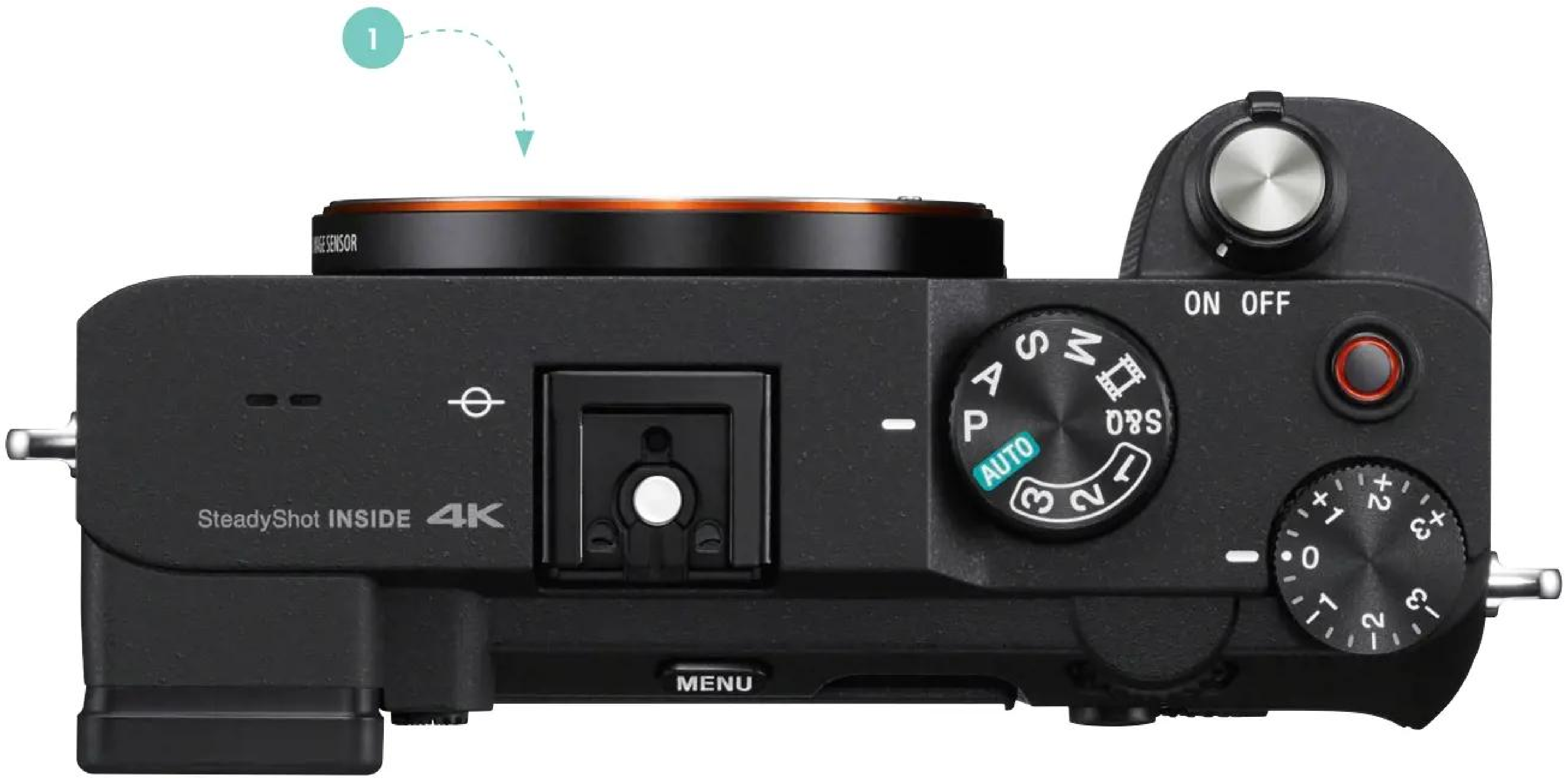
EXPOSURE COMPENSATION

touch-control that's available. When you're standing in front of the camera, you might want to adjust the white balance to give you more accurate skin tones, for example, but it's not possible to make settings adjustments or navigate the main or Function menus using the screen. Instead you have to use the buttons and dials, which in most cases means looking at the back of the camera.

A key advantage of a vari-angle screen is that you can tilt or twist it to give you a clear view – whether you're shooting portrait or landscape format images, it's perfect for spontaneous low or high-level photography.

Most full-frame cameras have a 0.5-inch type or larger viewfinder, but Sony has given the A7C a 0.39-inch type. This may have been to keep the size, weight and price of the camera down, but it means that you don't really get the full-frame feel of the A7C when

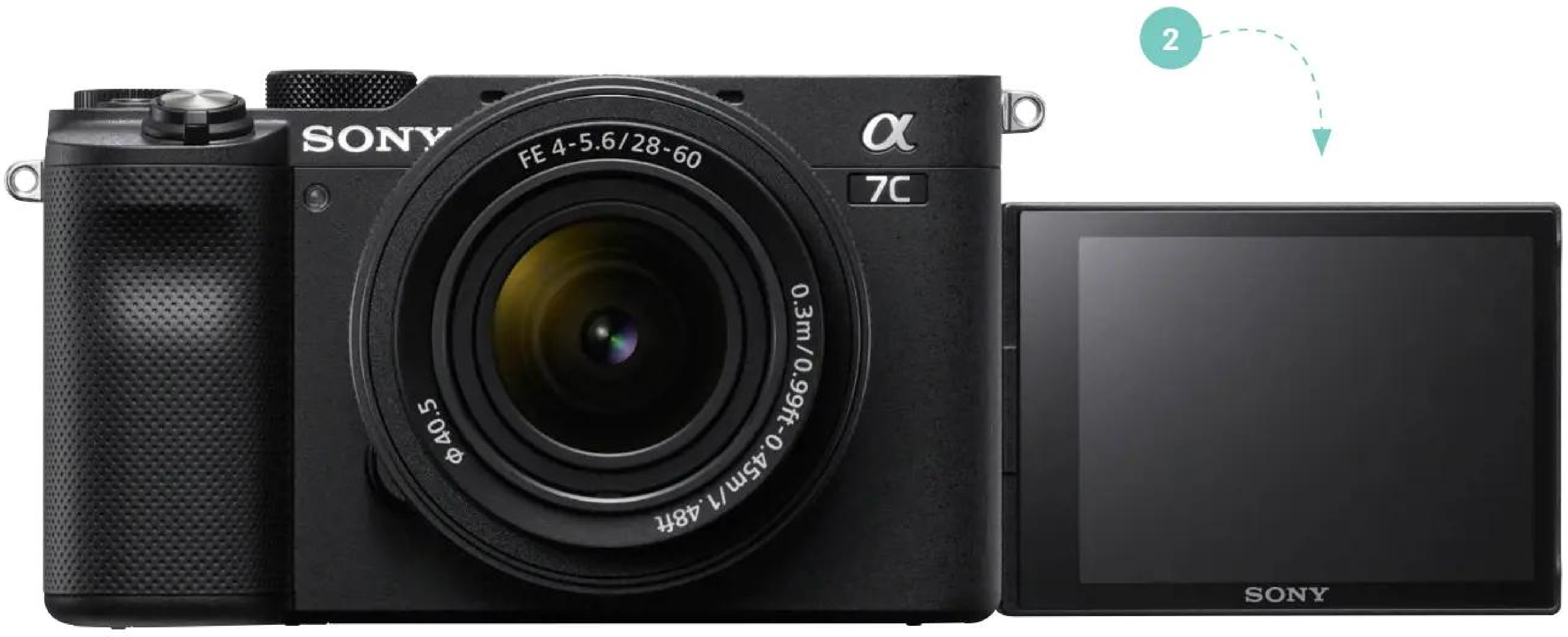




1
Monocoque design
The body is made from one piece of magnesium alloy covering the top, front and rear.

2
Vari-angle screen
With vloggers in mind, the A7C's three-inch screen can be flipped to face forwards.

3
Rectangular design
Sony has used a similar design to the A6000 series, so there's no viewfinder bump.



x5 © Angela Nicholson

Above Excellent latitude: The A7C's very wide dynamic range means that its images have excellent latitude for post-capture shadow and highlight adjustment

Right Strong noise control: Noise is controlled very well up to around ISO 12,800, but you can push the ISO higher without any major issues

Left Great AF: Whether you're shooting in low light or capturing a fast-moving subject, the A7C's AF system is very reliable

you look through the viewfinder. There's also no eye-up around the viewfinder, and as a result you may need to shield your eye on sunny days.

Better news is that, like the screen, the viewfinder gives an accurate preview of the image as it will be captured, so you can use it to guide the exposure and colour settings. On the whole, the A7C handles these aspects well in default settings, but it's worth keeping an eye on the white balance to make sure you get the atmosphere you want.

Sony has given the A7C its Fast Hybrid AF system with 693 phase-detection AF points and 425 contrast-detection points. These points cover around 93 percent of the sensor, so it can follow a moving subject close to the edges of the frame.

In use, the AF system certainly seems well-named, as it's very fast and responsive. It's quick to identify any moving subject and can keep pace with it as it moves towards or away from the camera. This, combined with the 10fps maximum shooting rate, makes the A7C a capable sports and action camera, although its shape isn't perhaps best-suited for use with very long lenses.

The A7C's Eye AF is also very good, and is especially useful for portraits or social photography, even in quite low light.

With a 61-MP full-frame sensor, the A7R IV is Sony's highest resolution full-frame Alpha camera, while the 12MP A7S III is the low-light and video-centric model. The A7C's 24MP sensor sits in between, offering a popular image and file size that doesn't demand very small pixels. Consequently, the A7C is able to control noise very well throughout its native sensitivity range. And in fact, no image noise is really visible up to around ISO 1600, and details are maintained well up to around ISO 12,800, when

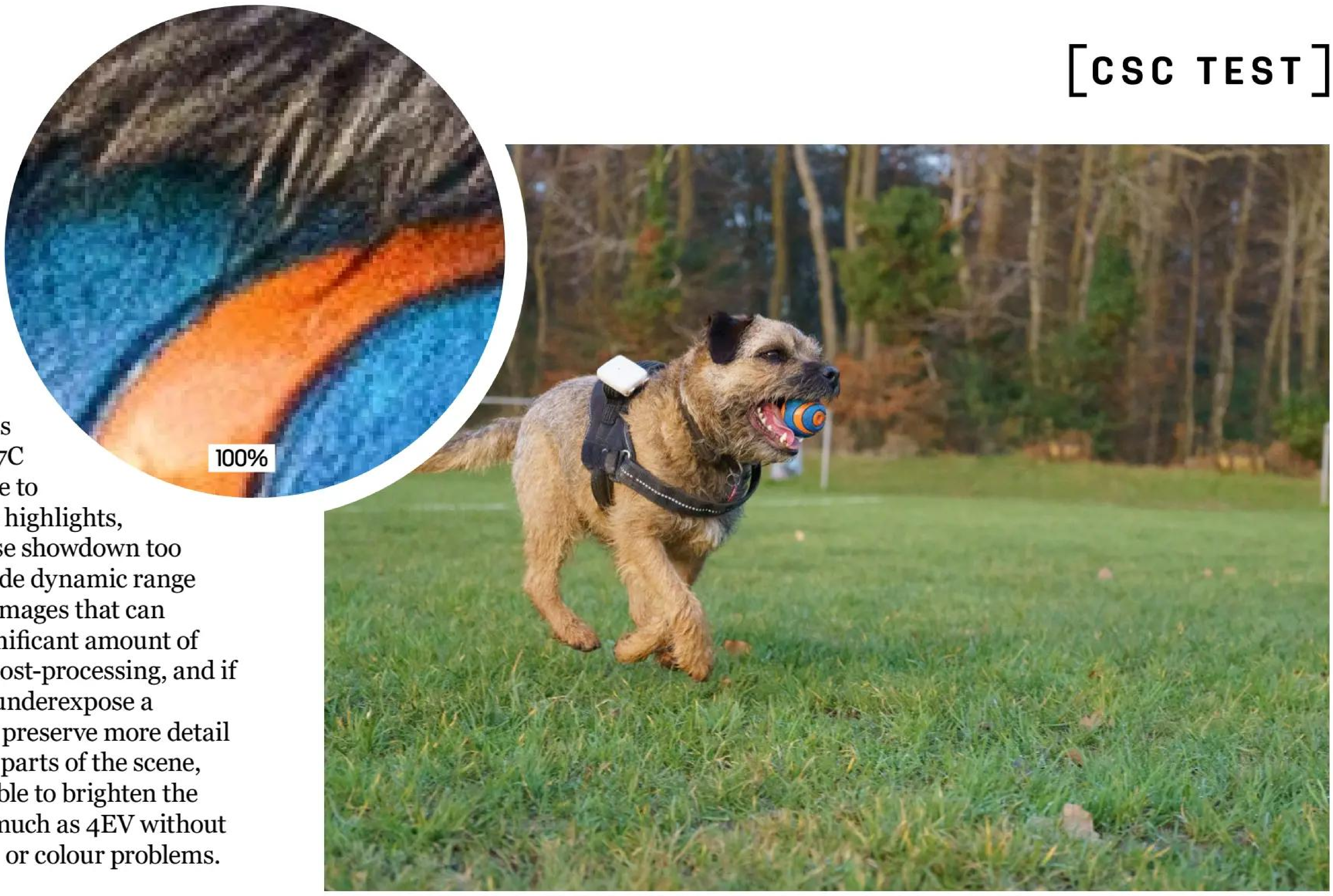
Focus Area modes

There are six Focus Area modes on the A7C: Wide, Zone, Center, Flexible Spot (which can be set to small, medium or large), Expanded Flexible Spot, and Tracking (in Continuous AF mode only). The natural inclination might be to use Center, Flexible or Tracking to photograph a moving subject, but the A7C does a great job of detecting a moving subject in Wide or Zone mode and then focusing on it, which is great when a subject suddenly appears in the frame. The AF boxes light up in green to let you know that the subject is being followed.

Eye AF needs to be activated in the menu and set to either Human or Animal. When Human is selected, it's also possible to specify whether to prioritise the right or left eye for focusing.

some of the finest details can start to look a little bit smudged under very close scrutiny.

Shooting in bright winter sunshine reveals that the Sony A7C isn't really prone to burning out the highlights, or creating dense showdown too quickly. This wide dynamic range translates into images that can withstand a significant amount of adjustment in post-processing, and if you do need to underexpose a low-ISO shot to preserve more detail in the brightest parts of the scene, you should be able to brighten the shadows by as much as 4EV without too many noise or colour problems.



> "The A7C is able to control noise very well throughout its native sensitivity range"

SONY A7C

Megapixels (effective)	24.2MP
Max resolution	6,000 x 4,000 pixels
Sensor information	Full-frame (35.6 x 23.8mm) Exmor R CMOS
Shutter speed	1/8000-30sec plus Bulb
ISO sensitivity	ISO 100-51,200 expandable to ISO 50-204,800
Exposure modes	iAuto, Program, Aperture Priority, Shutter Priority, Manual
Metering options	Multi-segment, Center-weighted, Spot (Standard/Large), Entire Screen Average, Highlight
Flash modes	External flash: Flash off, Autoflash, Fill-flash, Slow Sync, Rear Sync, Red-eye reduction (on/off selectable), Wireless, Hi-speed sync
Connectivity	USB Type-C, 3.5mm mic, 3.5mm headphone, Bluetooth, Wi-Fi
Weight	509g with battery and memory card
Dimensions	124.0 x 71.1 x 59.7mm
Batteries	NP-FZ100 rechargeable Li-ion
Storage	SD/SDHC/SDXC UHS-II
LCD	3-inch 0.92m-dot vari-angle touchscreen
Viewfinder	0.39-inch 2.35-dot OLED electronic viewfinder

FEATURES

The small viewfinder is disappointing, but there's a decent selection of video features available

★★★☆☆

BUILD QUALITY

The magnesium alloy monocoque design and weather-sealing help make the camera feel well-made

★★★★☆

HANDLING

There's limited touch-control, we missed a joystick, and would like a larger viewfinder

★★★☆☆

QUALITY OF RESULTS

Fast AF and a capable sensor enable the A7C to produce superb stills and videos

★★★★★

VALUE FOR MONEY

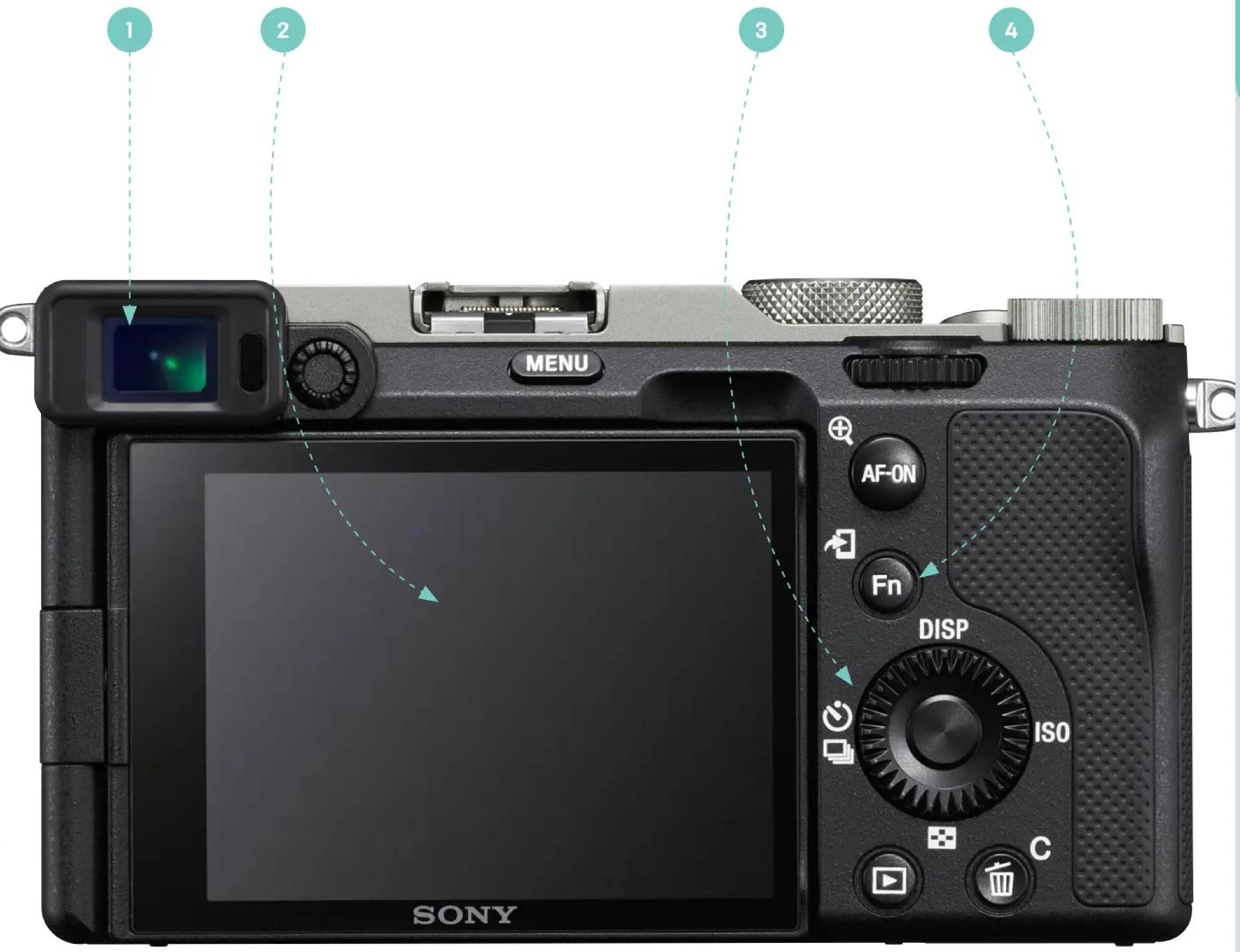
The A7C is more expensive and has a worse viewfinder than the A7 III, but has a vari-angle screen

★★★★☆

Overall

The Sony A7C scores where it really matters, with image quality and autofocusing, but the limited touch control is dated, and the small viewfinder seems mean.

★★★☆☆



① **Small viewfinder**
A 0.39-inch type viewfinder is more commonly found on APS-C format camera than full-framers.

② **AF point selection**
The AF point is set by tapping the screen or pressing the centre button and using the navigation controls.

③ **Dual dials**
Exposure settings are adjusted using the dial above the thumb rest and the dial around the navigation pad.

④ **Two Function Menus**
Helpfully, the options in the Function menu change depending upon whether you're shooting stills or video.

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CSC www.sony.co.uk

Sony Alpha 9 III

£6,099/$5,998

Packed with innovative technology, this Sony camera could change photography as we know it forever, says James Artaius

The Sony A9 III is, hands down, the most advanced camera ever made. While it isn't yet being referred to as the company's flagship, the A9 series has traditionally occupied that position. And as mighty as the Sony A1 is, its specs honestly look kind of quaint compared to the Sony A9 III. The best sports cameras are the launchpad for manufacturers' bleeding-edge technology, but we have never seen a camera with as much earth-shatteringly futuristic tech as the Sony A9 III. Terms like 'game changer' are banded about liberally these days, but this is a camera that could transform the way we use cameras.

With headlines including the world's first full-frame global shutter image sensor, 120fps continuous shooting at full resolution (24.5MP) jpeg and RAW, and the ability to shoot with a shutter speed of 1/80,000 sec, this is a camera made of pure photographic muscle. For those who haven't come across the concept of a global shutter, essentially it exposes whole frames on the sensor at the same time – rather than line-by-line, scanning left-to-right or from top-to-bottom, the way traditional sensors do. The result is that rolling shutter – the phenomenon where non-horizontal straight lines (whether they're golf clubs, baseball bats, telegraph poles or buildings) appear warped and distorted when shot at high electronic speed – is eliminated.

That global readout dovetails with the A9 III's second most amazing feat: a maximum shutter speed of 1/80,000sec. On the photographic side, this makes flash sync speeds extinct. It is simply so fast that it can sync with flash at all speeds, making not just standard speeds redundant (such as 1/250sec), but also rendering high-speed sync technology completely superfluous. There is a temporary caveat here, which is that the camera cannot shoot at 1/80,000sec in continuous mode; here, it maxes out at 1/16,000sec.

What else does the global shutter do? It gives us the ability to shoot continuous bursts of stills at 120fps. The Nikon Z 8 and

> "With headlines including the world's first full-frame global shutter, this is a camera made of pure photographic muscle"

Features

Full-frame sensor
The imaging sensor measures 35.7mm by 23.8mm but carries far fewer pixels (24.6MP) than other cameras in the Sony lineup.

Max resolution
The effective resolution can output files with maximum pixel dimensions of 6000 x 4000. This allows for the maximum frame rate of 120fps but still enables 4K video shooting.

Video resolution
The Sony A9 III can shoot Ultra HD 4K (3840 x 2160) video at 120p, 60p, 50p, 25p and 23.98p internally. Supported formats include XAVC S, XAVC HS and XAVC S-I.

CFexpress Type A
While many other manufacturers use the Type B format, Sony sticks with the Type A variant.

Composite RAW Shooting
This captures 32 RAW images that can be stacked in Sony Imaging Edge to minimise noise and false colour when shooting at high ISO to compensate for the more limited ISO performance of the global shutter sensor.

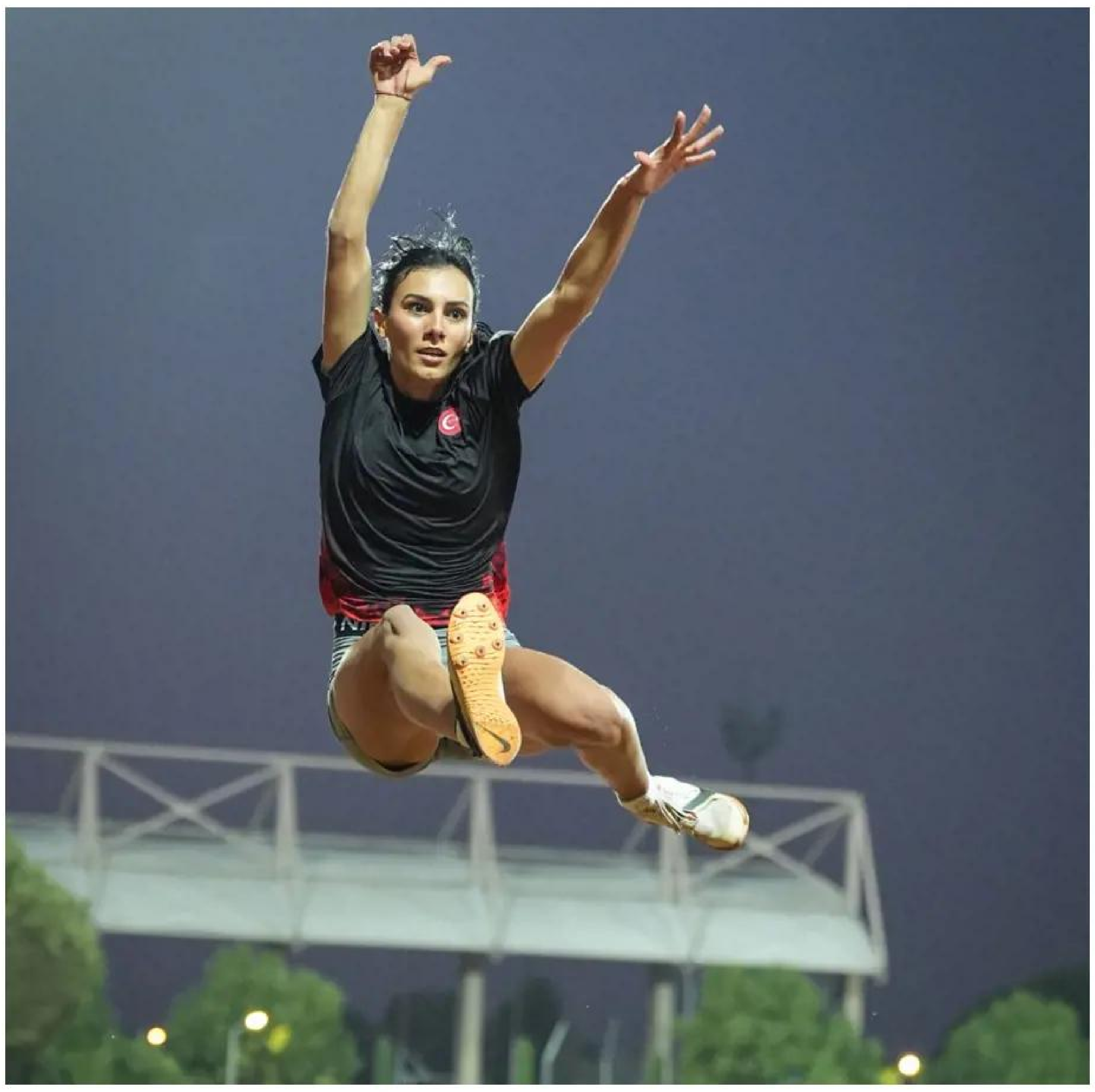
Max shutter speed
The electronic shutter is capable of up to 1/80,000sec but this tops out at 1/16,000sec in continuous shooting mode.

Z 9 can do this but only with 11MP jpegs. That's not a problem for the A9 III, though. It can rattle off 120fps images at full 24.6MP resolution, in 14-bit jpeg and RAW, blackout-free, with full autofocus and autoexposure.

The only realistic way of testing an elite-level sports camera is to shoot elite-level sports – so I torture tested the A9 III at an Olympic training facility, photographing teams as they prepared for the Paris 2024 Olympic games. With a lone subject in an empty space, the AF acquisition and tracking were flawless, keeping the athlete in focus whether facing the camera or fully contorting in the middle of a move.

Overall, I have to say that the A9 III's autofocus system is absolutely incredible. Bearing in mind that I was blasting away at up to 120fps and up to 120p in 4K, for the AF to keep up at all is remarkable enough. For it to be as resoundingly robust and subject-sticky as it is, it's actually pretty mind-blowing.

All images © James Artaius



Above On-target: In most conditions the A9 III's AF system kept up with fast-action sports

Left Gone global: The global sensor allows incredible top shutter speeds and burst frame rates

The only occasional issue I had was side-on shots, where acquisition took a fraction longer. High-jump subjects also posed a challenge as the AF simply didn't recognise the human body shape in such an unusual position.

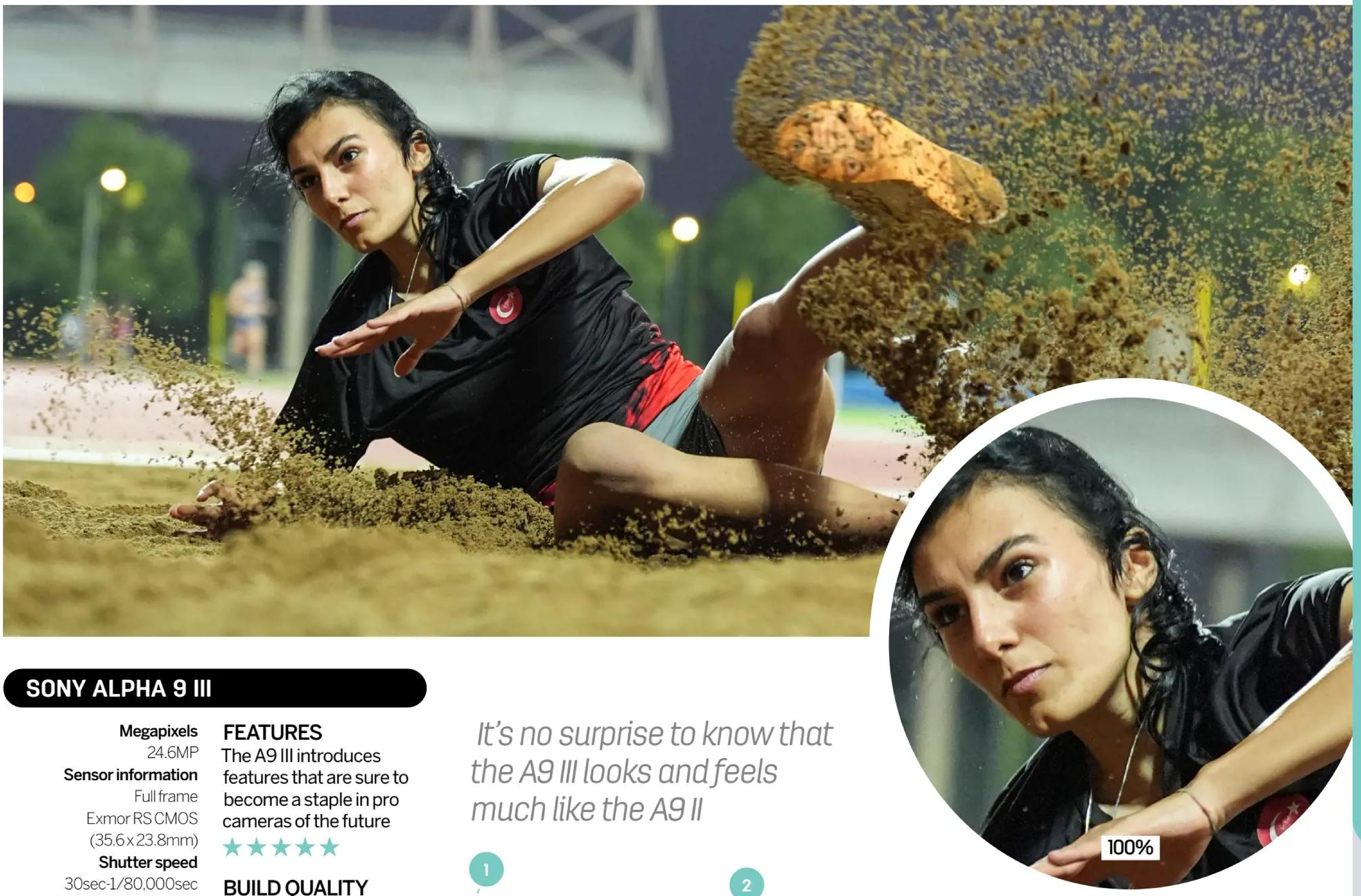
It's a running gag that all Alphas look and feel the same, so it's no surprise to know that the A9 III looks and feels much like the A9 II before it – which is to say it looks pretty and feels great in the hand – but with slightly refined ergonomics. This is mainly in the form of the beefier grip, which certainly offers much more purchase and a better handhold when using big lenses. The back of the camera is virtually identical apart from a different graphic on the record button. The top plate sees the most changes, with photo, video and S&Q now removed from the mode dial and placed on a collar switch surrounding it. I actually found this a little cumbersome in the heat of the moment, when I wanted to flick between stills and video, not helped by the slightly awkward dexterity required to simultaneously depress the lock button on top of the dial.

There will be some who scoff at the specs, questioning the need for a 1/80,000sec shutter or the point of 120fps shooting. And no doubt, there will also be naysayers at the other end of the spectrum, berating the relatively modest 24.6MP resolution. To put it kindly, this camera isn't meant for these people – it's for the Reuters photographers and NBA regulars. The A9 III is the best sports camera I've ever used. Can it be even better? Yes, it can. And, with future firmware updates, it no doubt will be.

Autofocus performance

Sony has made a bold claim about its new AI processing unit that powers Real-time Recognition AF. It promises 'human pose estimation technology' that recognises and tracks subjects' bodies and heads, even when they're facing away from the camera and in a small area of the screen. And mostly, that's exactly what it does. The discipline it handled most capably was gymnastics. With hurdles, it had few problems, given that the subject's face was always in the frame. But with kickboxing and Muay Thai, the A9 III was surprisingly less consistent than the A9 II.

Here, the camera is too clever for its own good. In mapping a database of human skeletal positions to predict movement, it is setting itself up to be tricked in the same way a boxer's opponent is when a feint or fake is thrown. This could account for the AF system occasionally getting confused about what to focus on, in a way that the A9 II didn't. It was particularly noticeable when shooting video, as the focus would dart around trying to stick to something.



SONY ALPHA 9 III

Megapixels	24.6MP
Sensor information	Full frame Exmor RS CMOS (35.6 x 23.8mm)
Shutter speed	30sec-1/80,000sec
Native ISO sensitivity	250 - 25600 (Native) 125 - 51200 (Ext.)
Drive speed	120fps max
Buffer	196 x 14-bit RAW files
Max video resolution	UHD 4K (3840 x 2160) 60p (oversampled 6K), 4K 120p (uncropped)
Autofocus options	Phase detection, 759 points stills, 627 points video, AI-based Real-time Recognition AF
Image stabilisation	Up to 8 stops
Connectivity	WiFi, BT, USB-C, HDMI, headphone, mic, sync
Batteries	Rechargeable Li-ion (NP-FZ100)
Storage	1x SD UHS-II, 1x CFexpress Type A
LCD	8.0cm (3.2-type) TFT with 2,095,104 dots
Viewfinder	0.64 inch Quad-XGA OLED, 9,437,184 dots, 0.9x magnification
Weight	702g (inc. battery/card)
Dimensions	136.1 x 96.9 x 82.9mm

FEATURES

The A9 III introduces features that are sure to become a staple in pro cameras of the future

★★★★★

BUILD QUALITY

The body maintains the pro grade feel of other top-end Sony mirrorless cameras

★★★★½

HANDLING

Refinements help the ergonomics, especially with larger lenses in use

★★★★☆

QUALITY OF RESULTS

AF could use some improvements but the blend of speed and quality is top-notch for pros

★★★★½

VALUE FOR MONEY

It's definitely not cheap but you're really paying for the world firsts in shutter technology

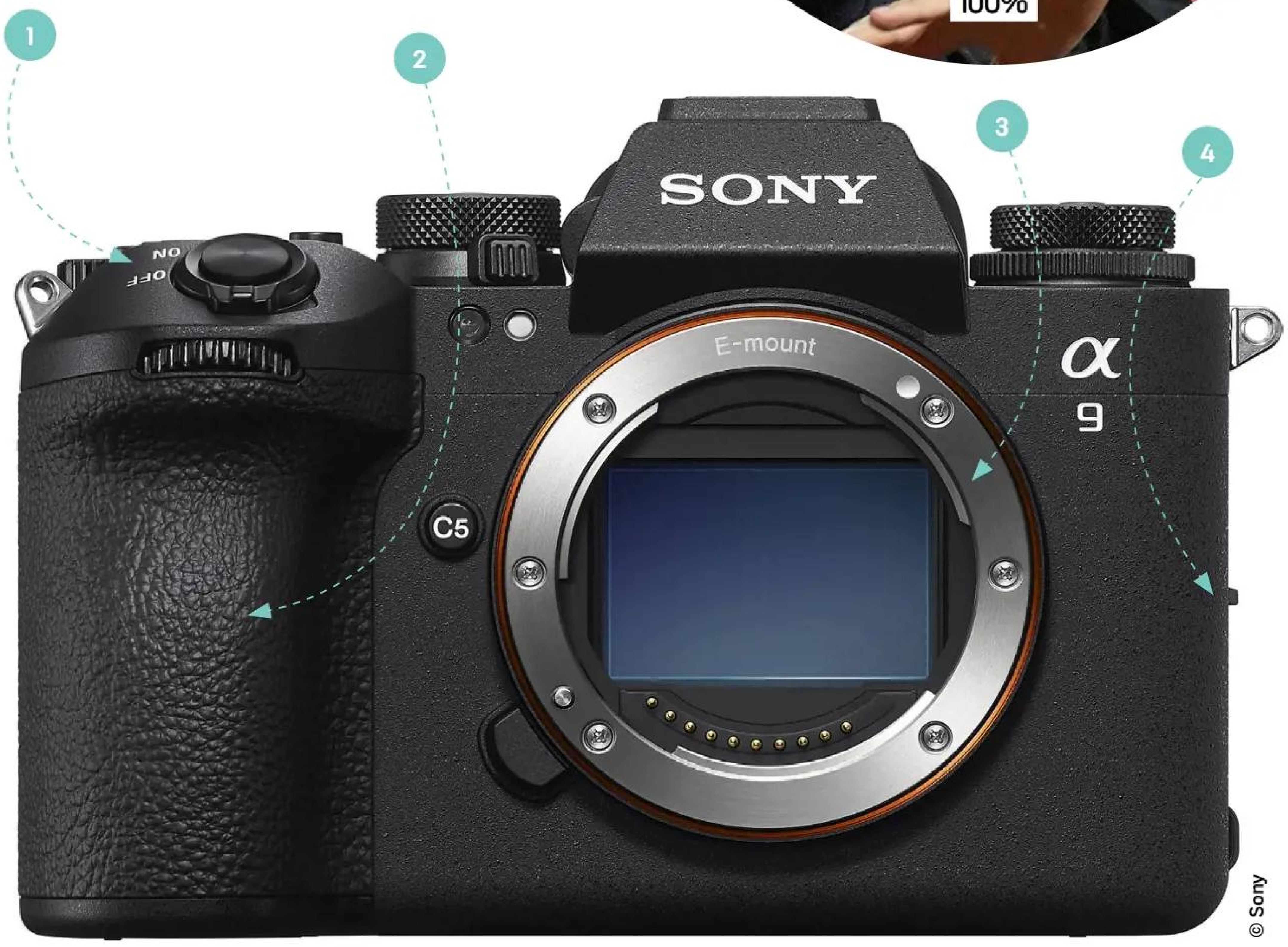
★★★★½

Overall

The Sony A9 III is currently the most advanced camera on the planet and could even usher in a new era for photography

★★★★½

> *It's no surprise to know that the A9 III looks and feels much like the A9 II*



© Sony

① **FAMILIAR LAYOUT**
If you have shot a Sony before, you'll fall right into step with the A9 III design philosophy.

② **REFINED HANDGRIP**
There have been marginal body redesigns that make handling smoother.

③ **LENS MOUNT**
Featuring a full-frame sensor, the A9 III can accept all FE-compatible optics.

④ **CARD FORMATS**
Users have a choice of SD or CFexpress Type A cards for backup or overflow duty.

Sony A7 IV

£2,399/$2,498 (Body only)

This enthusiast-centric all-rounder gets an upgrade. Angela Nicholson looks at what it has to offer

CSC www.sony.co.uk

Sony's tagline for the A7 IV is 'beyond basic' and you only need to cast your eyes over the specification list to see that it's far more than an entry-level full-frame camera. Designed as the all-rounder in the Sony A7 series, the IV seems to be a more affordable and scaled-back version of the A1.

Inside the A7 IV is a 33MP back-illuminated Exmoor R CMOS sensor – that's a significant step up from the 24MP sensor in the A7 III. While Sony hasn't opted to use a stacked CMOS design as it did in the A1, the new camera has the same Bionz XR processing engine. This high-power combination enables a native sensitivity range of ISO 100-51,200 (expandable to ISO 50-204,800) for stills and ISO 100-51,200 (expandable to ISO 100-102,400) for movies.

Like the A7 III, the A7 IV has a maximum continuous shooting rate of 10fps in continuous Hi+ mode. However, when a CFexpress A card is used, the A7 IV can shoot at that rate for up to 828 images when shooting uncompressed RAW and JPEGs simultaneously or for a limited sequence of images when any other file type is selected.

This impressive continuous shooting performance is matched by a top-notch autofocus system, with 759 phase-detection AF points and 425 contrast-detection points. There's also real-time tracking of human, animal or bird eyes in both stills and video modes. This works very well, picking up eyes a bit quicker and staying with them better than the A7 III. Alternatively, the subject can be selected with a tap on the screen to activate the Tracking AF (or by selecting Tracking in the Focus Area options when shooting stills). This does a fantastic job of sticking with the subject in both stills and video shooting. It proved the best option when photographing and videoing fast-paced football and rugby matches.

The A7 IV also debuts three new features to help with focusing issues, AF Assist, Focus Map and Breathing Compensation. When AF assist is activated the lens's manual focus ring can be used to shift the focus and then when the ring is released, the camera returns to using the AF system and subject tracking. Focus Map is similar to Focus Peaking but it overlays the image

Features

Sensor cover

Deep in the set-up menu under 'Anti-dust Function' there is the option to close the A7 IV's mechanical shutter on power-down to protect the sensor from dust.

Vari-angle screen

In a welcome move, the A7 IV has a vari-angle touchscreen that can be flipped out, angled up or down or rotated forward, making it more versatile than the A7 III's screen.

Dual card slots

Both of the A7 IV's card slots are compatible with SD/SDHC/SDXC UHS-II media, but one slot can also accept the new CFexpress Type A cards.

USB Power Delivery

The A7 IV can be powered using a power bank or other USB PD unit connected via its USB-C port. That's handy for lengthy shoots and extended periods of video recording.

Real-time streaming

Sony has made live-streaming with a dedicated camera much easier. As soon as the A7 IV is connected to a computer, it activates the streaming menu.

RAW, JPEG and HEIF

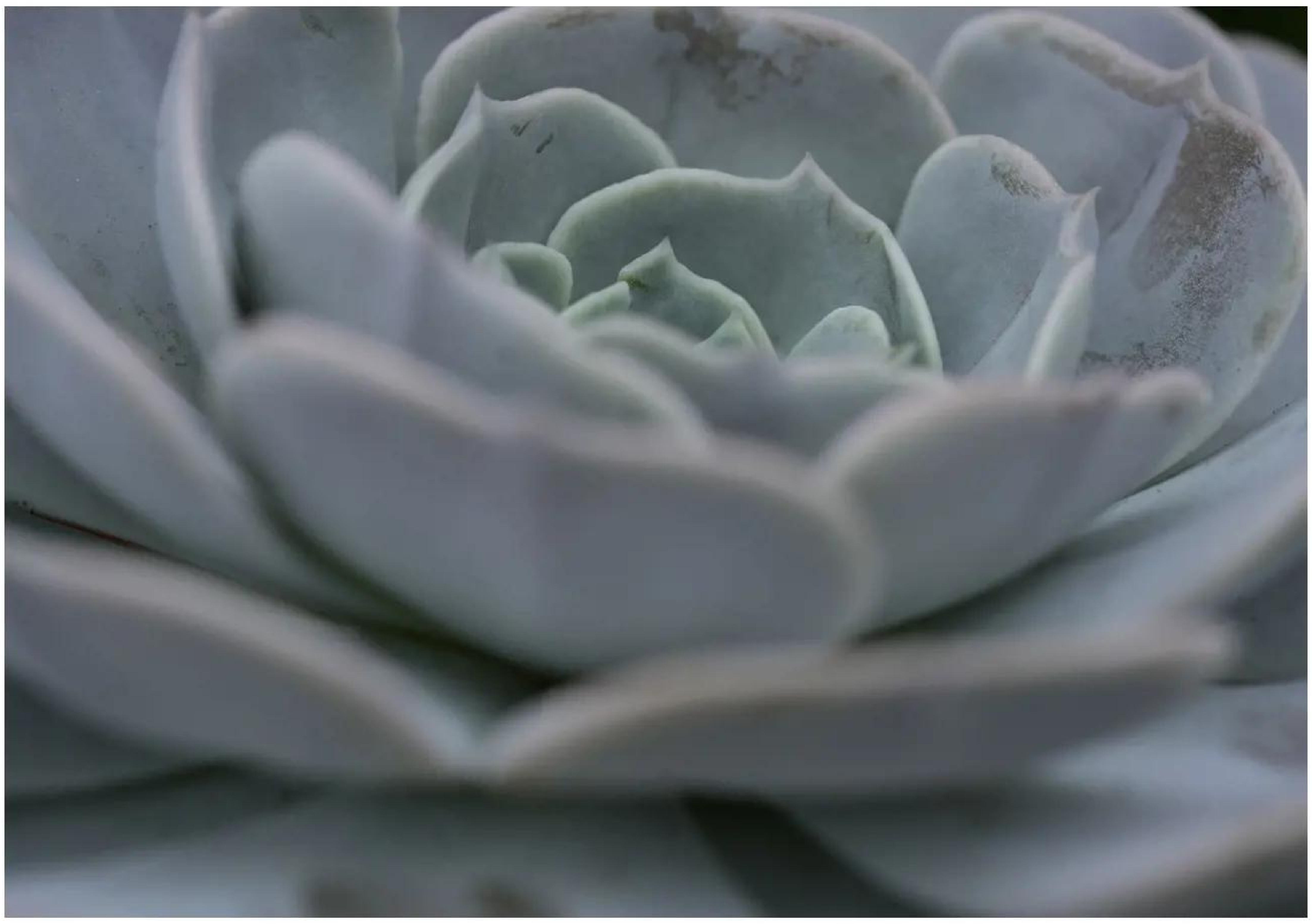
In addition to RAW and JPEG files, the A7 IV offers the ability to shoot 10-bit HEIF images for smooth gradations and greater tonal range without the associated enormous file sizes.

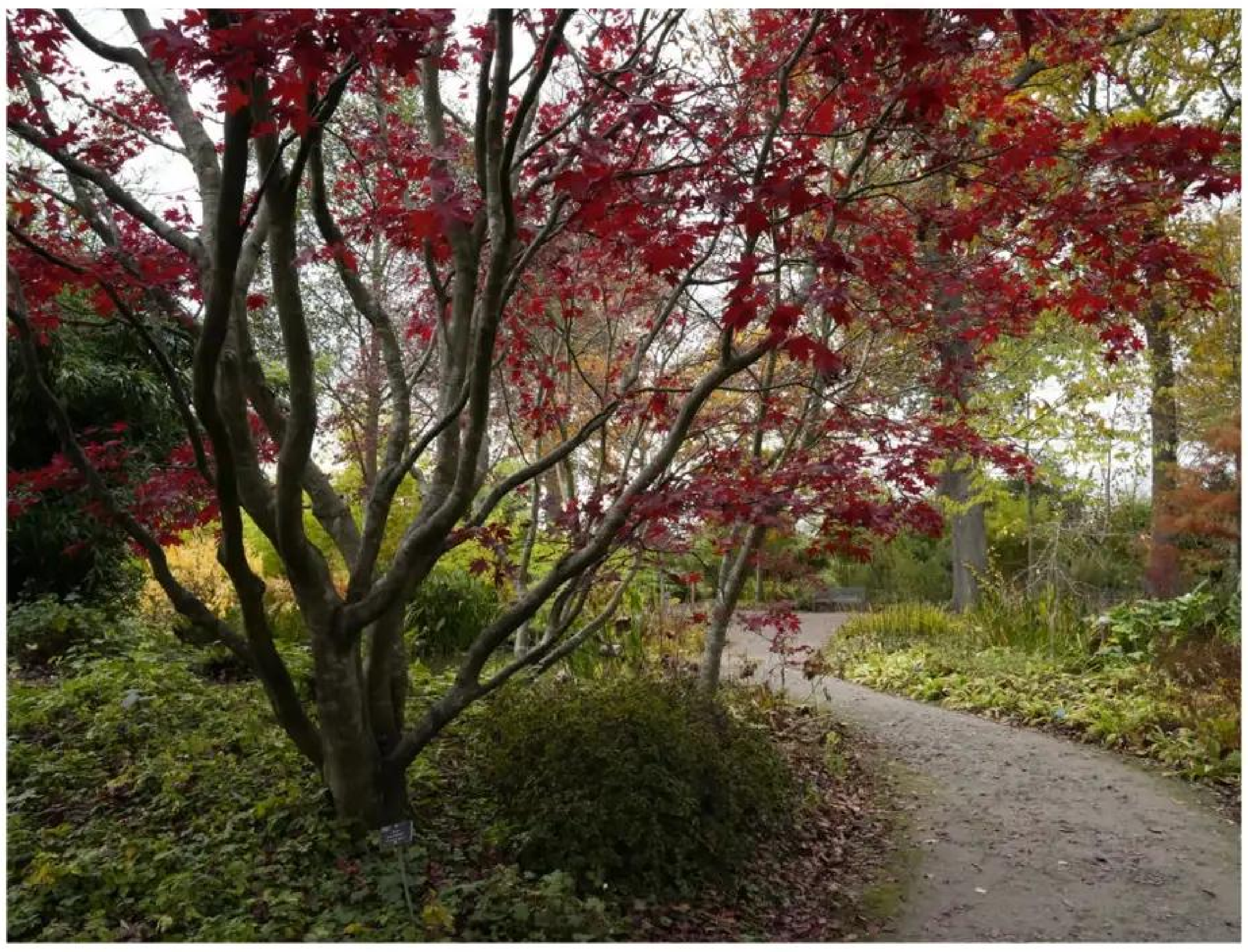
SENSOR COVER

① **Record button** Instead of being on its back, the A7 IV's record button is near the shutter release.

② **Chunky grip** Although it looks similar to the A7 III, the A7 IV has a much chunkier grip.

③ **Better weather-proofing** Sony has enhanced the A7 IV's dust- and moisture-resistance in comparison with its predecessor.





Above Extra detail: At low to moderate ISO values, the A7 IV captures a higher level of detail than its predecessor, the A7 III

Left Neutral colours: Colour rendition has improved, but presets are often a better option

Below Great tracking: The A7 IV does a good job of staying with your chosen subject, even with many distractions

with colour according to the focus to help you visualise the depth of field. Lastly, Breathing Compensation uses data from the lens (there are around 15 that are currently compatible) to apply a slight crop to ensure the framing of the image doesn't change with the focus distance.

Although there are a few changes to the control arrangement and it has a chunkier grip than its predecessor, the biggest handling changes made to the A7 IV centre on its screen. For a start, it's on a vari-angle hinge rather than a tilting bracket, so it can be flipped, angled and rotated to give a clear view from a wide range of angles in landscape or portrait orientation. While the screen's 1,036,800-dot resolution isn't anything to shout about, it gives a detailed enough view in most instances.

Sony has also given the A7 IV the revised menu structure that was introduced with the A7S III. This is more user-friendly than the previous version and it's responsive to touch, which makes using it that bit quicker and more intuitive. However, the myriad of video options and different setting combinations could still be better presented. Those who have plenty of experience in shooting video should be fine with the menu options, but such people are also more likely to be drawn to the A7S III. Less frequent video-shooters may need to spend some time working out which options best suit their needs.

Sony has also upgraded the viewfinder to a 0.5-inch type 3.68m-dot unit with a refresh rate of up to 120fps. Like the screen, it gives an accurate preview of the image's colour and exposure. Sticking with the subject of exposure, there are very few occasions when you need to turn away from the 1200-zone metering

Video features

The Sony A7 IV isn't just a well-featured stills camera, it's also a capable video camera. The headline specification here is its 4K 60 4:2:2 10-bit capability, but this comes with the caveat that this is in Super 35 mode, so the recording area is limited to a roughly APS-C sized section of the sensor. If you want to shoot using the full sensor, then the maximum frame rate at 4K resolution is 30p, but 7K oversampling delivers superb-quality results.

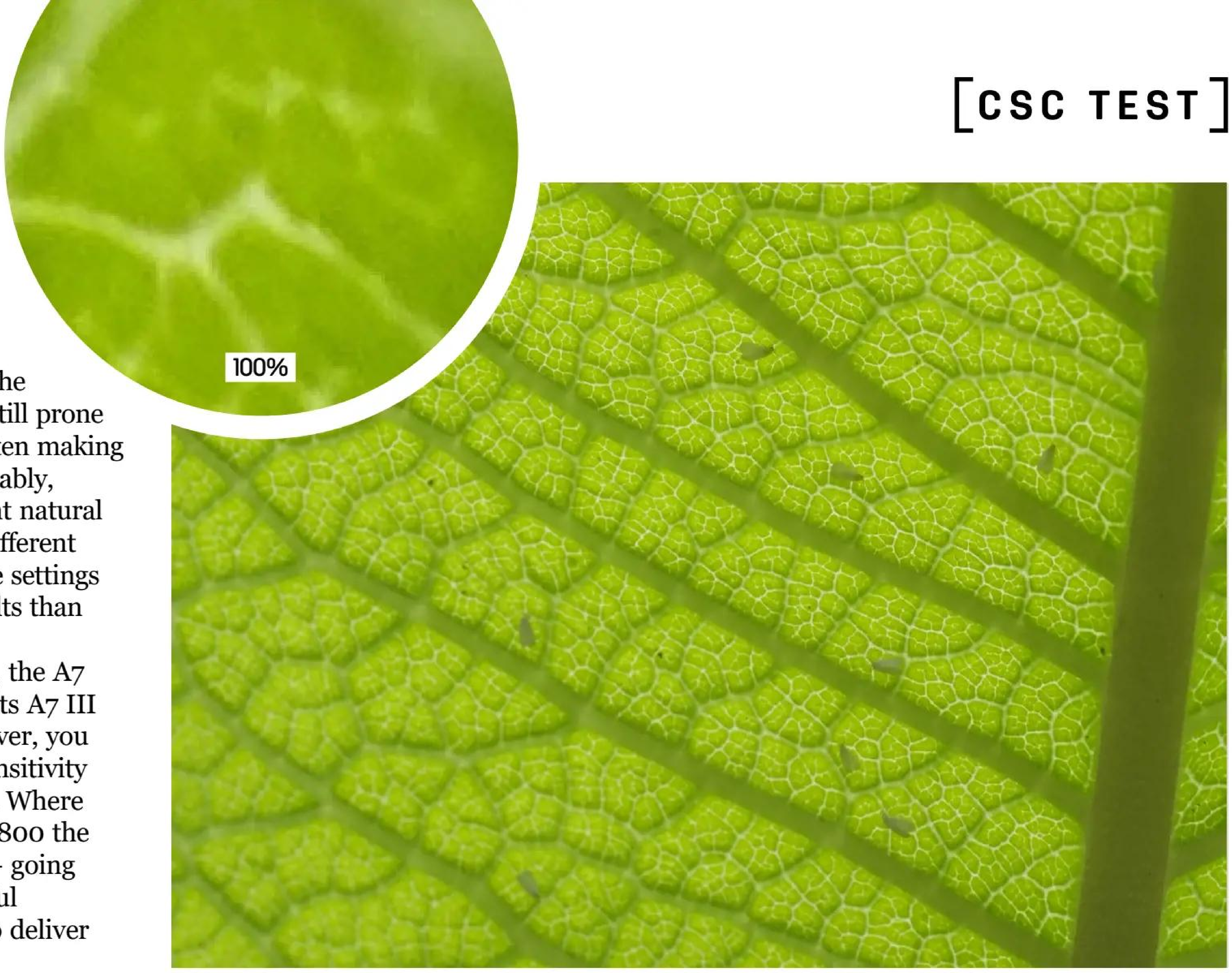
While the A7 IV has a full-sized HDMI port and can record to an external device, there's no RAW video recording capability. However, S-Log2 and S-Log3 gamma curves are available, with the latter enabling up to 15+EV of dynamic range.

There are also S-Gamut3 and S-Gamut3.Cine colour gamut settings, or for those who want to minimise post-capture grading, S-Cinetone and a selection of Creative Looks.

system's Multi-segment setting as it takes many things in its stride, making no major demands on the exposure compensation control.

Sony's colour rendition has improved over the years, but the auto white balance system is still prone to producing neutral tones, often making a preset a better option. Inevitably, switching between the different natural light settings gives images a different look, but the cloudy and shade settings produce more acceptable results than those of past cameras.

Thanks to its 33MP sensor, the A7 IV captures more detail than its A7 III competitor with 24MP. However, you need to keep an eye on the sensitivity value as noise levels creep up. Where possible, aim to make ISO 12,800 the maximum sensitivity setting – going beyond this may call for careful processing of the RAW files to deliver the best results.



> "This impressive shooting performance is matched by a top-notch autofocus system with 759 phase-detection AF points and 425 contrast-detection points"

SONY A7 IV

Megapixels (effective)	33
Max resolution	7008x4672
Sensor information	Full-frame Exmor R CMOS
Shutter speed	1/8000-30sec, Bulb
ISO sensitivity	Stills: ISO 100-51,200 (expandable to ISO 50 to ISO 204,800), Video: ISO ISO 100-51,200 (expandable to ISO 100-102,400)
Exposure modes	Intelligent Auto, Program, Aperture Priority, Shutter Priority, Manual
Metering options	Multi-segment, Center-weighted, Spot, Entire Screen Average, Highlight
Flash modes	Flash off, Autoflash, Fill-flash, Slow Sync, Rear Sync, Red-eye reduction, Wireless, Hi-speed sync
Connectivity	Bluetooth, Wi-Fi, USB-C, micro USB, HDMI, PC, 3.5mm, Multi interface shoe
Weight	658g (incl battery+memory)
Dimensions	131.3 x 96.4 x 79.8mm
Batteries	Rechargeable Li-ion NP-FZ100
Storage	Dual slot, CFexpress or SD/SDHC/SDXC UHS-II; SD/SDHC/SDXC UHS-II
LCD	3-inch 1,036,800-dot vari-angle touchscreen
Viewfinder	0.5-inch 3,686,400-dot EVF

FEATURES

There's a nice balance between resolution and files size, with great features for content creators

★★★★½

BUILD QUALITY

Improved weather-proofing and a chunkier grip give more confidence in the A7IV than its predecessor

★★★★☆

HANDLING

There's still room for improvement with the menu, but the handling is much better than with the A7 III

★★★★☆

QUALITY OF RESULTS

The A7 IV's images leap from the computer screen, with accurate focus and plenty of detail

★★★★★

VALUE FOR MONEY

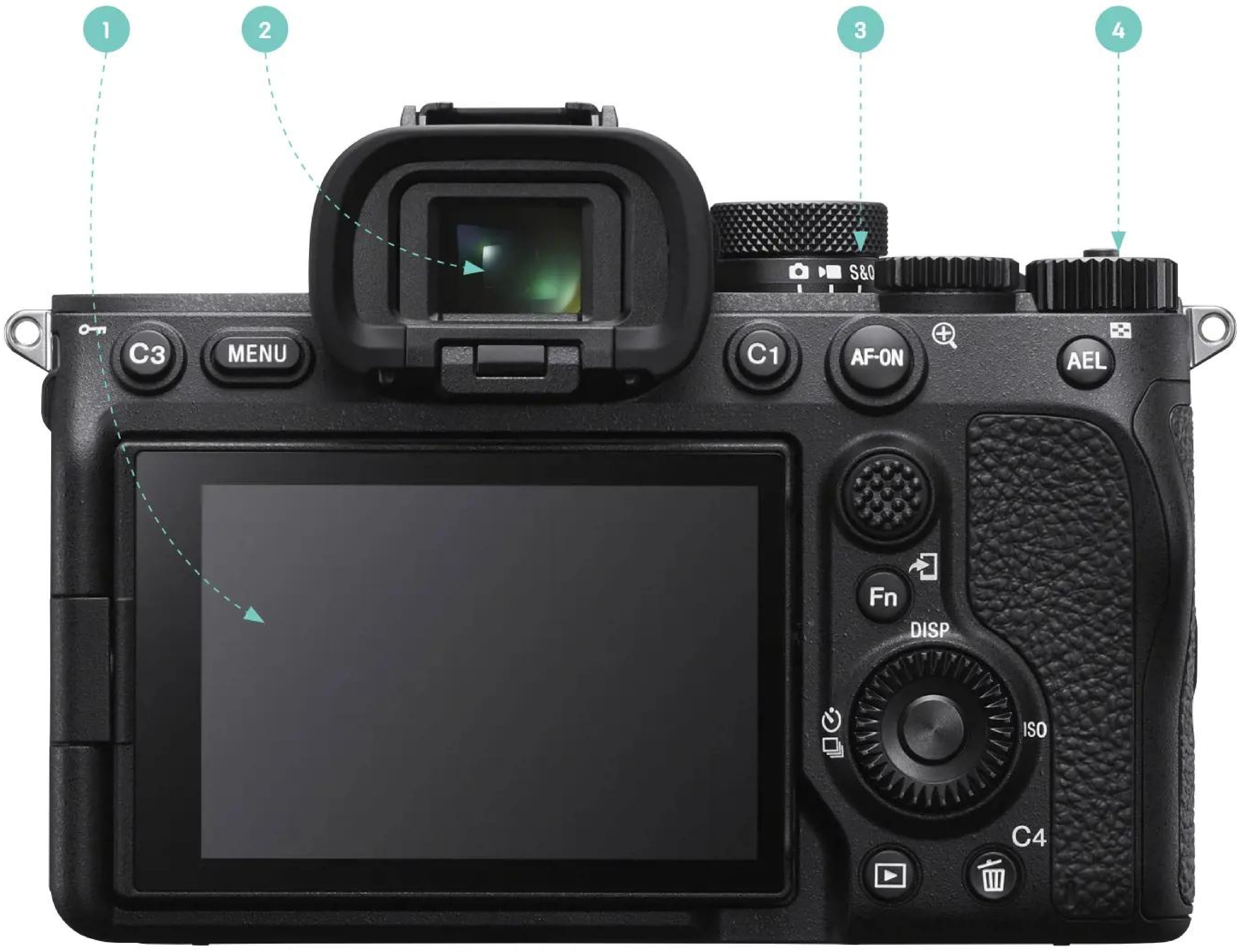
Its price isn't quite as head-turning as that of the A7 III, but Sony gives you plenty for your money

★★★★★

Overall

Sony has judged the A7 IV well, packing in some great features, a superb AF system and improved handling that makes this a more rounded camera than its predecessor.

★★★★★



① **Touch Tracking**
Select the subject to track by tapping the screen – the camera follows it like a dream.

② **Improved viewfinder**
With 3.68 million dots, the A7 IV's viewfinder has 1.6x the resolution of that on the A7 III.

③ **Shooting mode**
A switch under the mode dial lets you swap between stills, video and Slow & Quick mode.

④ **Customisable dial**
By default, this lockable dial adjusts exposure compensation, but this can be customised.

LENSES

FIND YOUR NEXT LENS WITH OUR IN-DEPTH REVIEWS

9 THINGS YOU SHOULD KNOW ABOUT USING PRIME LENSES

P96

100 **Portrait lenses**
Shoot perfect pictures of people

108 **Telephoto zooms**
Extend your reach

116 **Macro lenses**
Get closer to your subjects

124 **Wide-angle zooms**
Wide-angle zoom can give you a whole new perspective

Which lens?
Expert advice

A camera is just the starting point when taking up photography as a hobby or profession; the right lens for your camera can help you take a big (and the right) step forward.

There are plenty of different lenses to choose from. A fast telephoto zoom lens, for example, is a great investment. It's usually associated with shooting sport action and motion, but it can also make a great portrait lens, especially for shooting active families.

A macro lens will also let you get much closer to your subject for 1:1 (life-size) replication and great dramatic shots. But don't overlook the manual focus prime lenses, which usually have large maximum apertures to allow for fast shutter speeds: they make great walkabout optics.

HD PENTAX-DA 1:4.5-6
45-150
HD
0.9m/3.0ft–∞
135 100 70 50
50-230

116
Macro lenses

Nikon
AF-S MICRO NIKKOR 105mm 1:2.8G ED
VR
TAMRON
MACRO
Canon
MACRO 100mm
SIGMA
105mm 1:2.8 DG MACRO HSM
OPTICAL STABILIZER
OLYMPUS
SAMYANG
2.8/100mm

108

200
135
100
70
TAMRON
100
2 ft
∞
10
m
SP 70-200mm
F/2.8
Di VC USD G2
FULL
∞-3m

LAOWA
F2.8 Ø49mm
NO-000112
9mm
1.64
0.5
0.66
0.2

127

FE 2.8/50 MACRO

121

100
Portrait lenses

CANON LENS EF 85mm 1:1.4 IS USM
Canon
85mm
SIGMA
85mm 1:1.4 DG Ø86

9 THINGS YOU SHOULD KNOW ABOUT USING PRIME LENSES

IT'S ALL ABOUT QUALITY VS VERSATILITY

Zoom lenses are undeniably great when it comes to convenience and versatility, delivering a range of focal lengths at the flick of a wrist. However, they demand a compromise in terms of outright image quality. With complex arrangements of large groups of lens elements moving back and forth to enable the zoom action, the optical purity suffers as a result.

Sharpness is often the first casualty, and barrel and pin-cushion distortions often appear at the wide-angle and telephoto ends of the zoom range respectively. You can also expect an increase in chromatic aberration (colour fringing around high-contrast edges in a scene) and vignetting. The latter effect is most commonly seen when you're using large apertures at the wide-angle end. Zoom lenses are also often more prone to ghosting and flare.

With a high-quality prime lens, distortion and vignetting should be much less noticeable. Sharpness should also be excellent, so you can really make the most of the latest high-res sensors.

The need for speed

Another big bonus of using prime lenses is that they're usually 'faster'. This means they have a larger maximum aperture, which enables quicker shutter speeds.

For example, a typical 18-55mm zoom lens has a maximum aperture of f/3.5 at the wide-angle end, shrinking to a mere f/5.6 at about 50mm. Switch to a 50mm f/1.4 prime lens and the largest aperture will be four stops faster.

In low light you'd be limited to a shutter speed of, say, 1/15 sec with a typical zoom (unless you increase your ISO setting). However, an f/1.4 lens will enable a much faster shutter speed of 1/250 sec. An f/1.8 lens is 3.3 stops faster than an f/5.6 lens, and an f/2.8 model is two stops faster.

So-called 'faster' lenses aren't just good for avoiding camera-shake and freezing the action in dull lighting conditions. Another big advantage is that you can get a much tighter depth of field, enabling you to isolate the main point of interest in a shot by blurring the background. It's a favourite trick in portraiture, especially when the

Nikon
AF-S NIKKOR 28mm 1:1.8
SUPER EBC f=18mm 1:2 Ø52
FUJINON ASPHERICAL LENS
SAMYANG
1.4/24mm
24mm
AF
MF
Canon
CANON LENS EF 24mm 1:1.4

G 1:2.5/14 ASPH. φ46
LUMIX

background is cluttered and would otherwise be a distraction in the picture.

It can be tricky to use large apertures in bright, sunny conditions, but you can get round the problem by fitting a neutral density (ND) filter. These often have a fixed value, but it's also possible to get variable NDs, and these are a great option when you're shooting video and want the cinematic, shallow depth of field that's all the rage.

Focal length and sensor size

An important factor to consider when you're buying a prime lens is which focal length to go for. Back in the days of 35mm film, a 50mm prime was considered a 'standard' lens. That's because it gives pretty much the same perspective as viewing a particular scene with the human eye, without the magnification of a telephoto lens or the shrinkage a wide-angle lens uses to squeeze a lot more into the frame.

With a variety of sensor sizes now available, it's not quite a clear-cut now. If you've got a DSLR with a smaller APS-C sized sensor like a Canon EOS Rebel T6i / 750D or Nikon D3400, things are a little different because of the so-called crop factor applied, with a 35mm lens providing pretty much the same perspective on these cameras as you would get from a 50mm lens on a full-frame DSLR camera.

With all that in mind, to help you get more from your fixed-focal length optic, we've offered up the nine points that you should know about using prime lenses with your camera, below.

1

They make you work harder

With a zoom lens, it's easy to get lazy and zoom in and out, letting the lens do the hard work for you, but a prime lens makes you think about the shot more, forcing you to be more creative.

2

Bigger is better

The 'fastest' lenses have apertures of f/1.4 or f/1.8 and enable higher shutter speeds and reduced depth of field. This makes them more useful than f/2.8 lenses.

3

Choose your focal length

Before diving in and getting your prime lens, do your research. You may think you need a 24mm prime, but a quick look at the focal lengths you use most in Lightroom or Adobe Bridge might reveal that in actual fact you tend to shoot more at 28 or 35mm.

4

Open wide

When shooting at the maximum aperture with fast f/1.4 lenses, outright sharpness can be a bit lacking in some instances, particularly at the edges of the frame, but this varies from lens to lens.

5

Close quarters

A macro facility adds versatility, but you'll have to be very close to the object you're shooting with a 50mm lens, and a 35mm is almost unusable.

6

Play with light

Invest in a neutral density filter if you want to shoot with large apertures – it will reduce depth of field in sunny conditions.

7

Weight

With few moving parts, prime lenses are more compact and lighter than their zoom siblings – perfect if you want to travel light. That said, some expensive primes with lots of quality glass elements that's matched by a tank-like build quality can be heavy.

8

Sitting pretty

A 50mm lens on an APS-C format body is a great combination for portraiture. A maximum aperture of f/1.4 or f/1.8 enables you to blur the background much more effectively than you'd be able to with a budget 18-55mm zoom lens.

9

Investment banking

If your budget can stretch to it, buy a professional optic, such as a full-frame compatible lens, even if you currently use an APS-C format DSLR – one day you may decide to trade up to a full-frame camera.

PORTRAIT LENSES

We've rounded up some lenses that are perfect for portraiture. But, as you'll see, some are more perfect than others…

Think portraiture, and you're probably thinking an 85mm prime lens would be good. And you'd be right. Mounted on a full-frame body, the 85mm focal length gives a flattering perspective and enables a comfortable working distance.

Even if you're shooting with an APS-C format body, an 85mm lens works brilliantly for tight head shots and for head-and-shoulders portraiture. However, a shorter focal length is certainly preferable for Micro Four Thirds. Meanwhile, a 'fast' aperture rating enables a tight depth of field for blurring the background, literally focusing all the attention on the main subject.

There are some fabulous top-end lenses from around, including the Canon RF 85mm f2 IS Macro STM at £619 ($599) and the Nikkor Z 85mm f/1.8 S for £799 ($797). But let's face it: most of us are not purely portrait photographers. We like to shoot all sorts of subjects.

Without a lottery win, it doesn't make much sense to blow a fortune on a 'portrait' lens we might only use infrequently. So here are the best buys for great portraiture at reasonable prices.

Matthew Richards

THE CONTENDERS

1 **Canon** RF 85mm f2 IS Macro STM	£619/$599
2 **Fujinon** XF 50mm f/1.0 R WR	£1,499/$1,499
3 **Nikkon** Z 50mm f/1.2 S	£2,299/$2,097
4 **Panasonic** Lumix S 50mm f/1.8	£1,499/$1,499
5 **Nikkor** Z 85mm f/1.8 S	£799/$797
6 **Olympus** 45mm f/1.8 M Zuiko Digital	£279/$399
7 **Sigma** 85mm f/1.4 DG HSM | A	£899/$1,199
8 **Tamron** SP 85mm f/1.8 Di VC USD	£749/$749

Getty

CANON LENS RF85mm F2 MACRO IS STM
Canon
85
0.5m-∞
FULL
0.35m-0.5m

CSC www.canon.com

Canon RF 85mm f2 IS Macro STM

£619/$599

Is this prime lens an affordable macro option for users of the Canon R system?

The Canon RF 85mm f2 IS Macro STM is a compact lens and is pleasingly lightweight for a full-frame-compatible f/2 optic, of this focal length. As is common for RF lenses, there is a handy control ring, forward of the easily accessible focus ring. This is a logical layout for this type of optic and both rings are comfortable to operate, without taking your eye from the viewfinder.

The focus ring itself is a little on the 'loose' side – we'd prefer more resistance, though you do need to turn it quite extensively to alter the focus position, so it shouldn't be easy to accidentally nudge focus. The barrel has a nice texture and provides a good grip, while build quality is in line with other models in its price bracket.

Performance

Autofocus is quick and accurate – that STM does its work smoothly, which is perfect for insect photography and when switching from near to far focus positions, so don't be put off by the lack of USM. It's also very quiet. Optically the glass performs splendidly. Images are sharp, with lovely contrast, from centre to edges. The bokeh is also attractive, which is great as this will also find its way into the kit of many portrait photographers.

As with any lens this wide, tilting the camera upwards to capture tall buildings can result in very strong converging verticals.

The RF 85mm f2 IS Macro STM has a useful focal length covering flowers, street photography, travel, portraiture and even some wildlife subjects

SPECIFICATIONS

Elements/construction: 12 elements in 11 groups
Minimum focus distance: 0.35m
Angle of view: 28º 30' (diagonal)
Max aperture: f/2
Min aperture: f/29
Mount: Canon RF
Filter size: 67mm
Dimensions (dia x length): 78 x90.5mm
Weight: 500g

WE SAY...

The main issue with the RF 85mm f2 IS Macro STM is that it isn't a true macro lens – it only manages 1:2 (half life-size). There is no weather sealing either, but for the money you get a fantastic portrait lens, with a useful close-up capability.

VERDICT

FEATURES	★★★★★
BUILD & HANDLING	★★★★★
PERFORMANCE	★★★★★
VALUE	★★★★½
OVERALL	★★★★★

SUPER EBC XF 50mm 1:1 R WR ø77
1.0
1.4
2
2.8
4
5.6
8
11
16
A
50

CSC www.fujifilm.com

Fujinon XF 50mm f/1 R WR

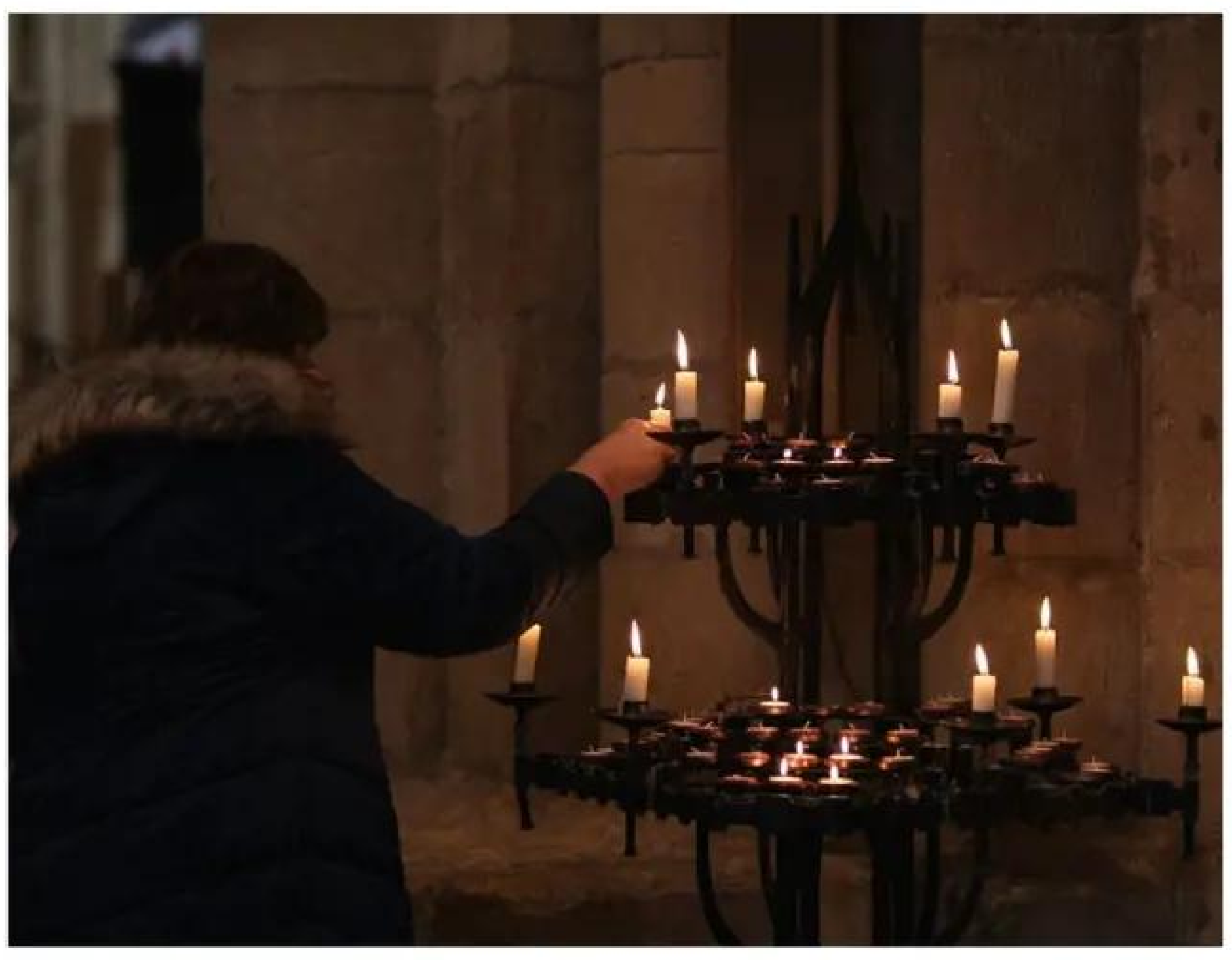
£1,499/$1,499

Conquering the darkness is the aim for this lens, but does it meet expectations?

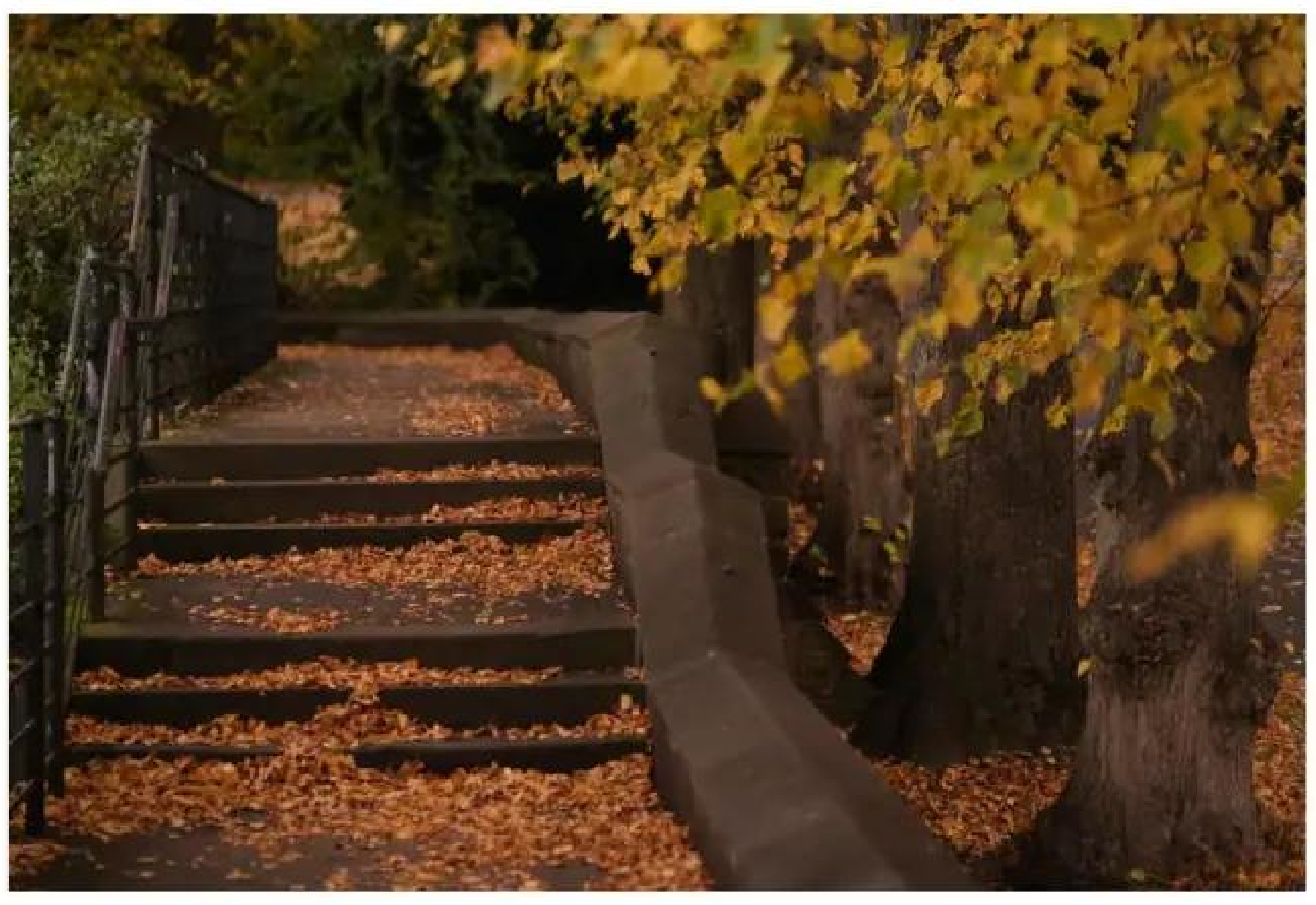
For anyone willing to pay £1,500 for a 50mm lens you can guarantee that professional use is the order of the day. Therefore, while the main selling point of the Fujinon XF 50mm f/1 R WR is certainly the large aperture, users will also be expecting a solid construction. Here the lens does not disappoint. The barrel feels like an all-metal construction, capable of withstanding significant knocks and scrapes. The focus ring has a nice texture and offers enough resistance to make focusing precise and smooth – essential when working wide open, as depth of field is incredibly shallow. While this is definitely a large optic, it is not cumbersome and is surprisingly lightweight. It seems well-balanced on larger Fujifilm cameras, such as the X-T4 we tested it on, and it can be comfortably held with a single hand on the body grip.

Performance

As you might expect, image quality is of a high standard. While it's softest at f/1, this is to be expected, and by f/2.8 the resolution is excellent, as is contrast. Chromatic aberrations are barely noticeable, although some spherochromatism is visible in out-of-focus highlights, with magenta or green fringing. At f/1 there's some catseye distortion in the bokeh, but otherwise this is attractive.



Shooting wide open at f/1, a shutter speed of 1/125 sec was achievable even at ISO 160, making handheld shooting possible in this poorly lit interior.



At f/1 depth of field is so shallow that an almost miniature effect can be created for landscapes. Colour is accurate, while contrast is natural and punchy.

SPECIFICATIONS

Elements/construction: 12 elements in 9 groups
Minimum focus distance: 70cm
Angle of view: 31.7°
Max aperture: f/1.0
Min aperture: f/16
Mount: Fujifilm X
Filter size: 77mm
Dimensions (dia x length): 87x103.5mm
Weight: 845g

WE SAY...

Overall the XF 50mm f/1 R WR is an excellent optic, although autofocus is a point of concern – there is a lot of glass to move, and focusing is a bit slow, making the lens of questionable use for events such as weddings.

VERDICT

FEATURES	★★★★★
BUILD & HANDLING	★★★★☆
PERFORMANCE	★★★★★
VALUE	★★★★☆
OVERALL	★★★★★

DISP
L-Fn
50/1.2 S
A
M

CSC www.nikon.co.uk

Nikon Z 50mm f/1.2 S

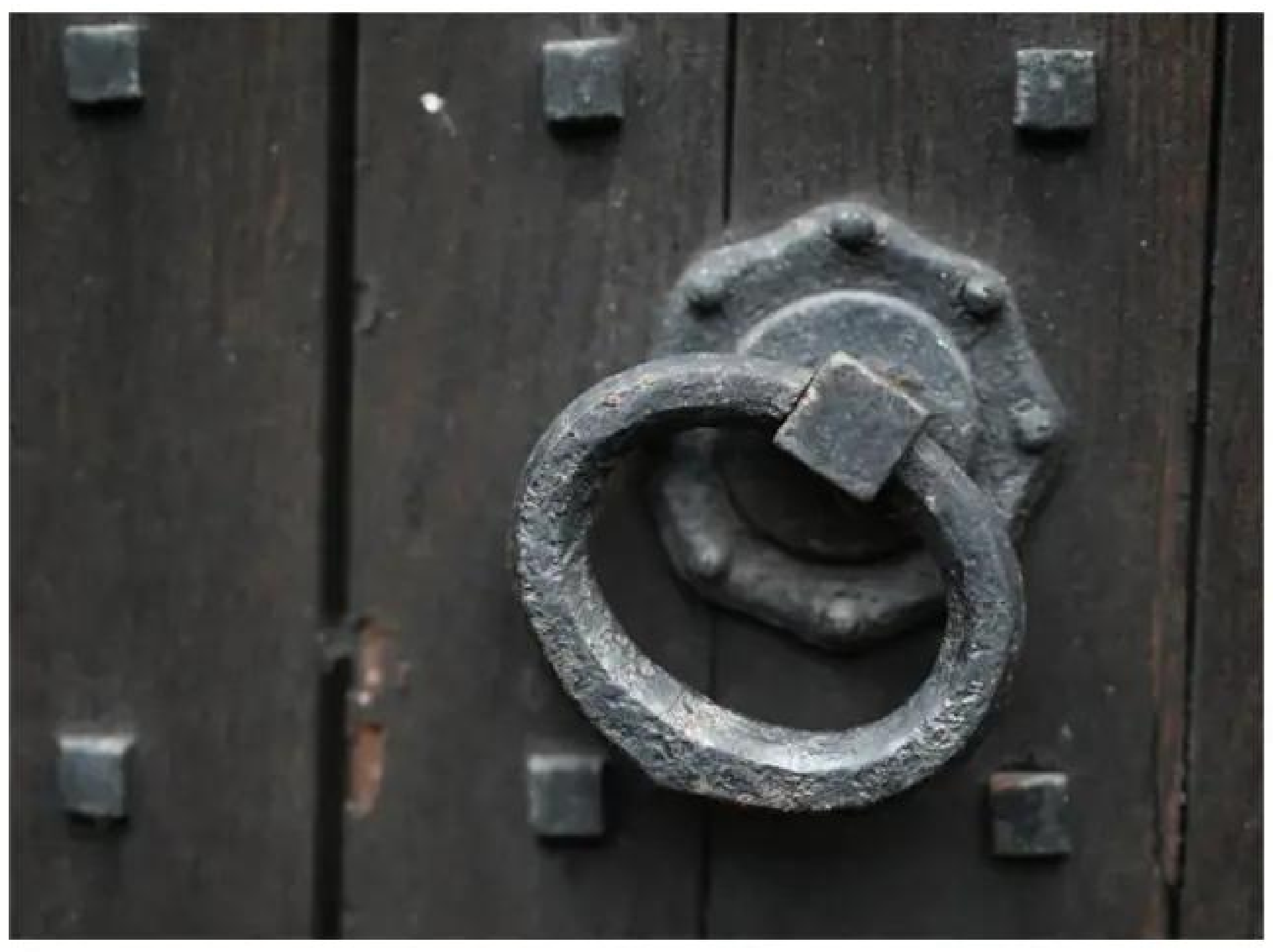
£2,299/$2,097

Nikon extends the versatility of its Z system, but is it worth the expense?

It's hard to believe this is a 50mm lens – it's huge! While the idea that mirrorless kit has to be smaller than DSLR equivalents is finally dying, the dimensions of this 'standard' prime could be considered a little excessive. That being said, weight is not a huge issue, and the lens is more practical than it might initially seem. Build quality is excellent, and the wide focus ring makes manual focusing easy and comfortable. The optic's size is due in part to the presence of the OLED display and function button, which are a nice addition, though questionable for day-to-day photography. Overall, the lens handles very well and is built for pro use.

Performance

The image quality is as superb as the physical size of the lens – sharpness and contrast is stunning. Even at f/1.2 detail across the frame is exceptional. The close focusing distance enables gorgeous defocused backgrounds, allowing the subject to really 'pop'. A slight weakness is the bokeh quality when stopped down – blurred highlights take on a noticeable polygonal shape, despite the nine-bladed aperture. This isn't a deal-breaker, though, and the lens is a great performer for portraits.



With a close focusing distance, excellent focus control is possible, with depth of field reduced to only a few millimetres

Even in dull conditions the colour and contrast rendering here produces images with depth and energy, while distortion is low, and fringing well-controlled

SPECIFICATIONS

Elements/construction: 17 elements in 15 groups
Minimum focus distance: 45cm
Angle of view: 47°
Max aperture: f/1.2
Min aperture: f/16
Mount: Nikon Z
Filter size: 82mm
Dimensions (dia x length): 89.5 x150mm
Weight: 1090g

WE SAY...

There are definitely cheaper, more portable options for your Z camera – a nifty 50 this certainly isn't. Nikon already makes some terrific alternative 50mm lenses, but the image quality here is absolutely wonderful, so buying decisions will come down to budget and intended use.

VERDICT

FEATURES	★★★★★
BUILD & HANDLING	★★★★★
PERFORMANCE	★★★★☆
VALUE	★★★★½
OVERALL	★★★★½

LUMIX
S 1:1.8 / 50mm Φ67
AF MF

CSC www.panasonic.com

Panasonic Lumix S 50mm f/1.8

£1,499/$1,499

It's cheaper than its f/1.4 sibling but is this nifty fifty up to pro standards?

Often, thanks in no small way to the term nifty fifty, which we didn't miss the opportunity to use above, 50mm f/1.8 lenses tend to be viewed as cheap and cheerful entry-level optics. This lens from Panasonic's S line feels a lot more substantial however, offering a pro-grade handling experience. The metal lens mount and solid barrel construction set it apart from similar lenses. The full-time manual focus ring is also a giveaway that Panasonic intends for the product to be used by working professionals. It's smooth to operate, with a nice resistance to it. The build incorporates dust, moisture and freeze resistance, meaning we felt at home using it in the rain.

Performance

As you'd expect from a 50mm prime, sharpness is above average and zooming in on captured images reveals a tonne of fine detail. Edge performance is also pretty good wide open. Aberrations such as fringing is kept to a minimum, as is distortion. Colour rendition is accurate and levels of contrast are attractively high. AF is pretty quick and silent when racking focus too.

It is possible to shoot with the lens wide open at f/1.8, allowing handheld shooting in darker environments, while still resolving good detail at the frame corner

While still attractive overall, there is some cats eye distortion of defocused highlights, which can be distracting where these are highlighly visible

SPECIFICATIONS

Elements/construction: 9 elements in 8 groups
Minimum focus distance: 0.45cm
Angle of view: 47°
Max aperture: f/1.8
Min aperture: f/22
Mount: L-Mount
Filter size: 77mm
Dimensions (dia x length): 73.6x82mm
Weight: 300g

WE SAY...

The Lumix S 50mm f/1.8 is definitely a good lens. It offers impressive image quality – enough to keep the most discerning pros happy – and has an excellent build. If you can do without the latter however it does start to look a little expensive, since other 50mm f/1.8 lenses can be found for less than £200. If you do buy one though, we're sure you'll be happy with it.

VERDICT

FEATURES	★★★★★
BUILD & HANDLING	★★★★★
PERFORMANCE	★★★★☆
VALUE	★★★★½
OVERALL	★★★★½

Digital Camera ★★★★★ BEST ON TEST

Digital Camera ★★★★★ GOLD AWARD

Mount option: Nikon Z

Nikkor Z 85mm f/1.8 S

£799/$797

Yet another fabulous Z lens

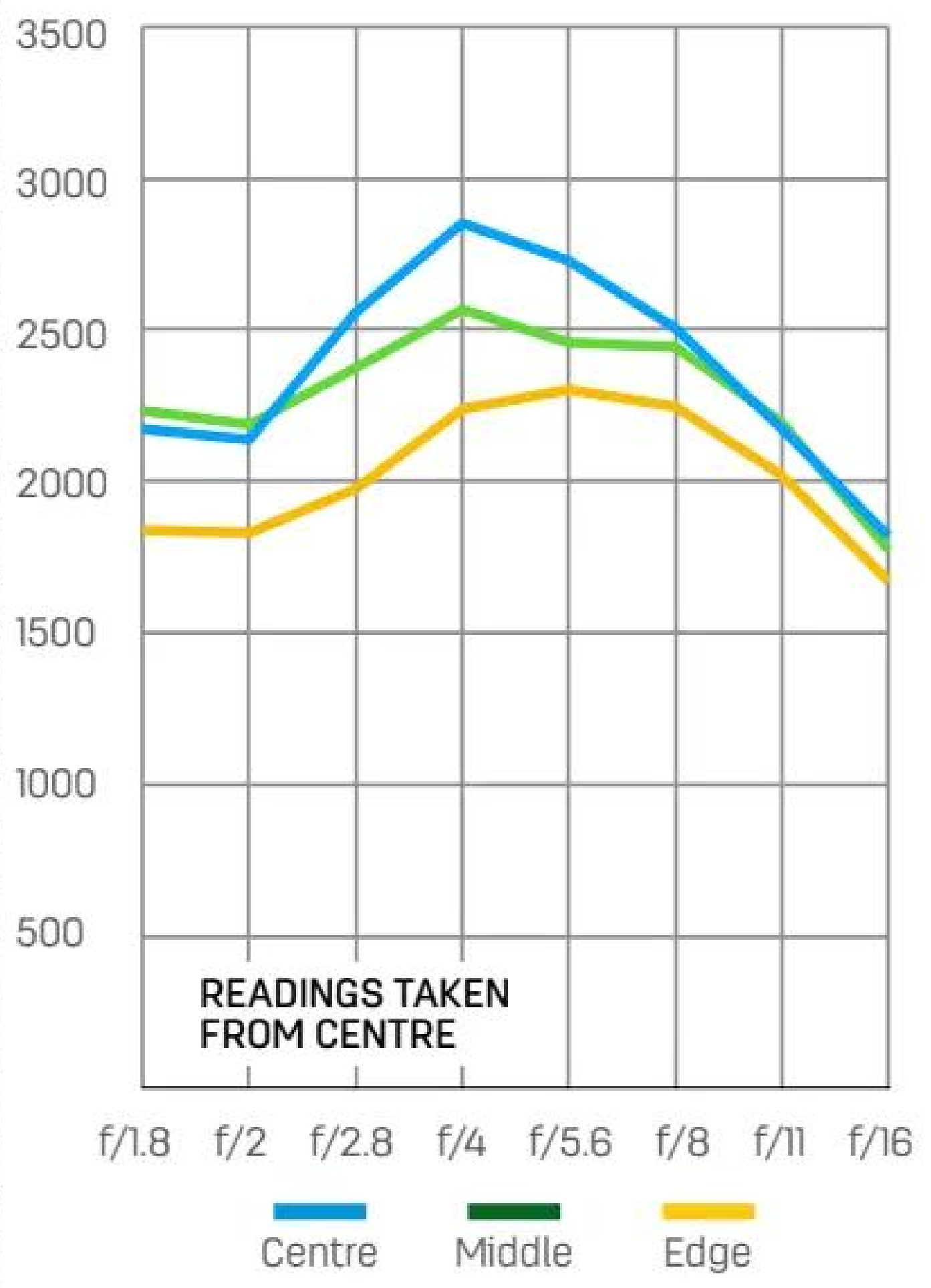
The Nikon Z 35mm f/1.8 S missed out on winning our group test of street lenses by the narrowest of margins. As with that lens and the Z 50mm, an f/1.8 aperture enables great quality with a reasonably compact and light construction. In the 85mm sector, however, a slightly faster aperture is often preferred, so this Nikon Z lens has something to prove.

Quality optics include two ED elements and Nano Crystal Coat. There are no aspherical elements, but this can be a bonus for bokeh. Rapid autofocus is driven by a virtually silent stepping motor.

Performance

Contrast and sharpness across the entire frame are simply spectacular, even wide-open. Despite 'only' being an f/1.8 lens, bokeh is gorgeous and noticeably smoother than from Nikon's pricier, top-flight f/1.4 F-mount lens.

SHARPNESS HIGHER IS BETTER



It's unlikely you'll need such razor-sharpness across the whole frame, but it's available.

FRINGING (AT F/8) LOWER IS BETTER

Fringing 0.35

There's virtually no chromatic aberration of any kind, right across the whole frame.

DISTORTION NEARER 0 IS BETTER

Distortion -0.1

As with some of the other lenses on test, this Nikkor Z is virtually distortion-free.

VERDICT	
FEATURES	★★★★★
BUILD & HANDLING	★★★★★
PERFORMANCE	★★★★★
VALUE	★★★★½
OVERALL	★★★★★

Mount option: Micro Four Thirds

Olympus 45mm f/1.8 M. Zuiko Digital

£279/$399

Light and budget-friendly

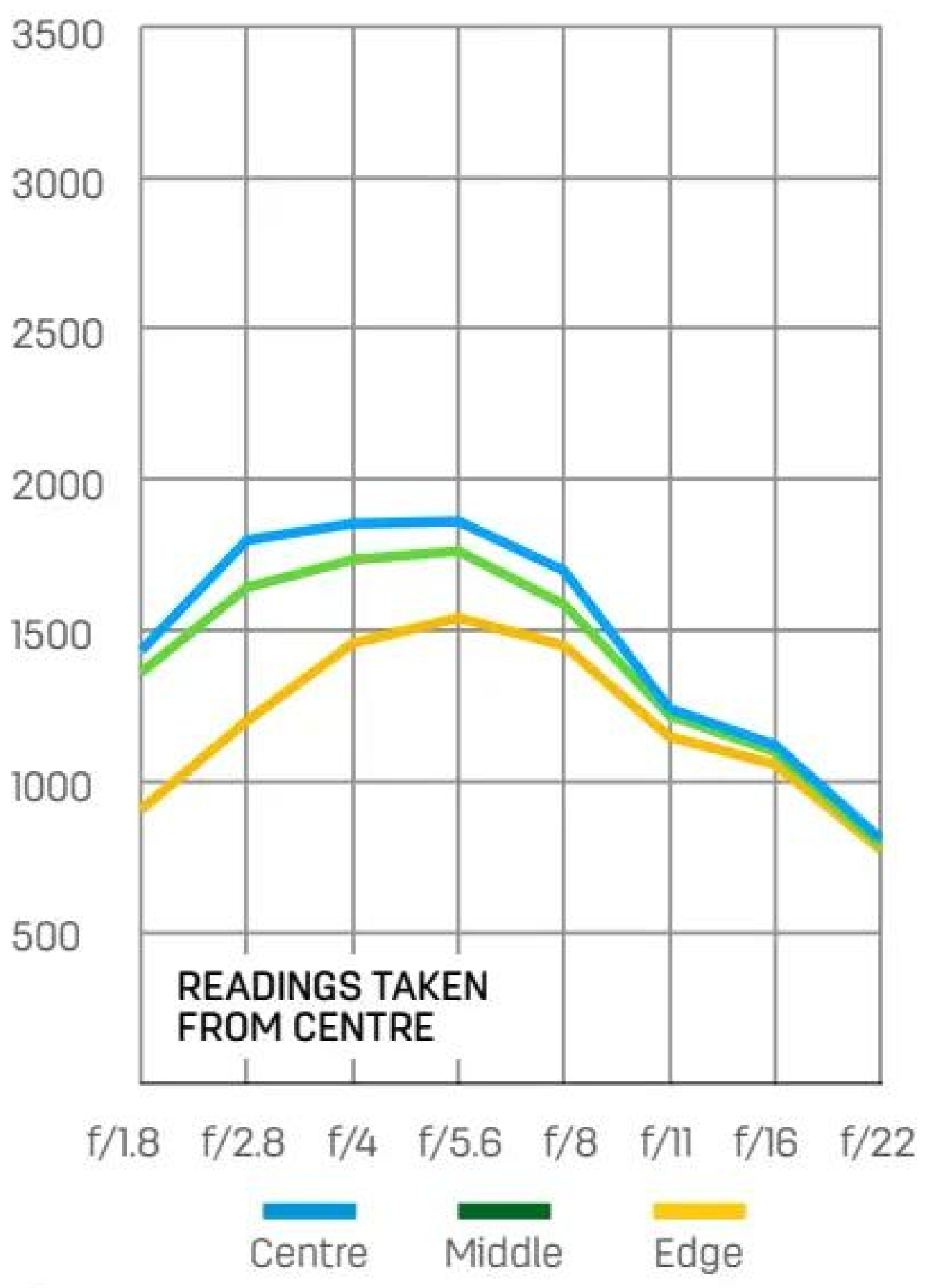
Thanks to the 2x crop factor of the Micro Four Thirds system, this lens has an effective focal length of 90mm. It also has a fast aperture of f/1.8, bringing some much-needed help in getting a tight depth of field – generally a struggle with MFT cameras.

Measuring just 56 x 46mm and weighing a mere 116g, the Olympus is the smallest and lightest lens here. Autofocus is driven by an ultra-quiet stepping motor, while high-precision manual focusing is available via a 'fly by wire' focus ring.

Performance

Sharpness remains good across almost the entire frame, even wide-open, where it only drops off towards the extreme edges. However, bokeh isn't as smooth as with any of the other lenses and, when stopping down a little, points of defocused light take on a pronounced heptagonal shape.

SHARPNESS HIGHER IS BETTER



Sharpness at wide apertures is easily good enough to give a real pop to portraiture.

FRINGING (AT F/8) LOWER IS BETTER

Fringing 0.59

There's next to no fringing at wide apertures and only a little at medium to narrow settings.

DISTORTION NEARER 0 IS BETTER

Distortion 0.3

We're used to minimal distortion in MFT lenses, but this one has a little pincushion.

VERDICT	
FEATURES	★★★½☆
BUILD & HANDLING	★★★½☆
PERFORMANCE	★★★½☆
VALUE	★★★½☆
OVERALL	★★★½☆

Mount option: Canon EF | Nikon FX | Sigma SA | Sony E | Leica L

Sigma 85mm f/1.4 DG HSM | A

£899/$1,199

A heavyweight contender

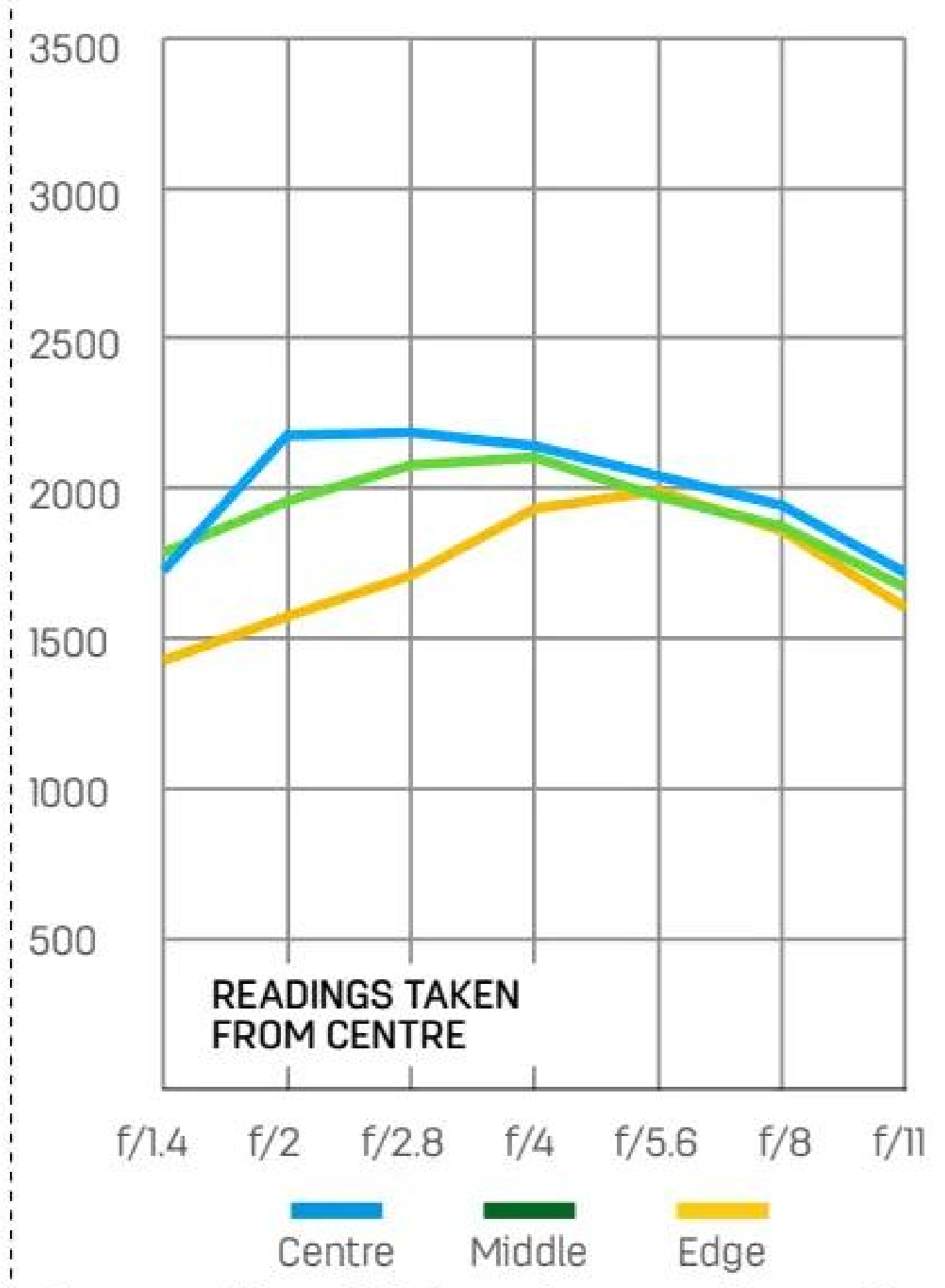
Now available in Canon EF, Nikon F, Sony E and Leica L mount options, this Sigma is a weighty proposition for an 85mm f/1.4 lens, at 1,130g. Typical of Sigma's Art series, it's designed for premium image quality without any concessions to compactness.

The complex optical path is based on 14 elements, including an aspherical element at the rear and two SLD (Special Low Dispersion) elements, placed at the centre and towards the front. Autofocus is based on a ring-type ultrasonic system, and weather seals are built-in.

Performance

Autofocus is both fast and accurate. Sharpness across the entire frame is hugely impressive, even wide-open, which is a real challenge for an f/1.4 lens. We've noticed a little 'onion ring' effect in the bokeh of some Sigma Art lenses, but it's negligible in this one.

SHARPNESS HIGHER IS BETTER



Lenses with an f/1.4 aperture are often soft wide-open, but this retains superb sharpness.

FRINGING (AT F/8) LOWER IS BETTER

Fringing	0.36

The minimal amount of fringing is almost as negligible as from the Nikkor Z 85mm.

DISTORTION NEARER 0 IS BETTER

Distortion	0.03

Again, like the Nikkor Z lens, the Sigma is essentially distortion-free.

VERDICT	
FEATURES	★★★★½
BUILD & HANDLING	★★★★★
PERFORMANCE	★★★★★
VALUE	★★★★★
OVERALL	★★★★½

Mount option: Canon EF | Nikon FX | Sony A

Tamron SP 85mm f/1.8 Di VC USD

£749/$749

A lens to beat the shakes

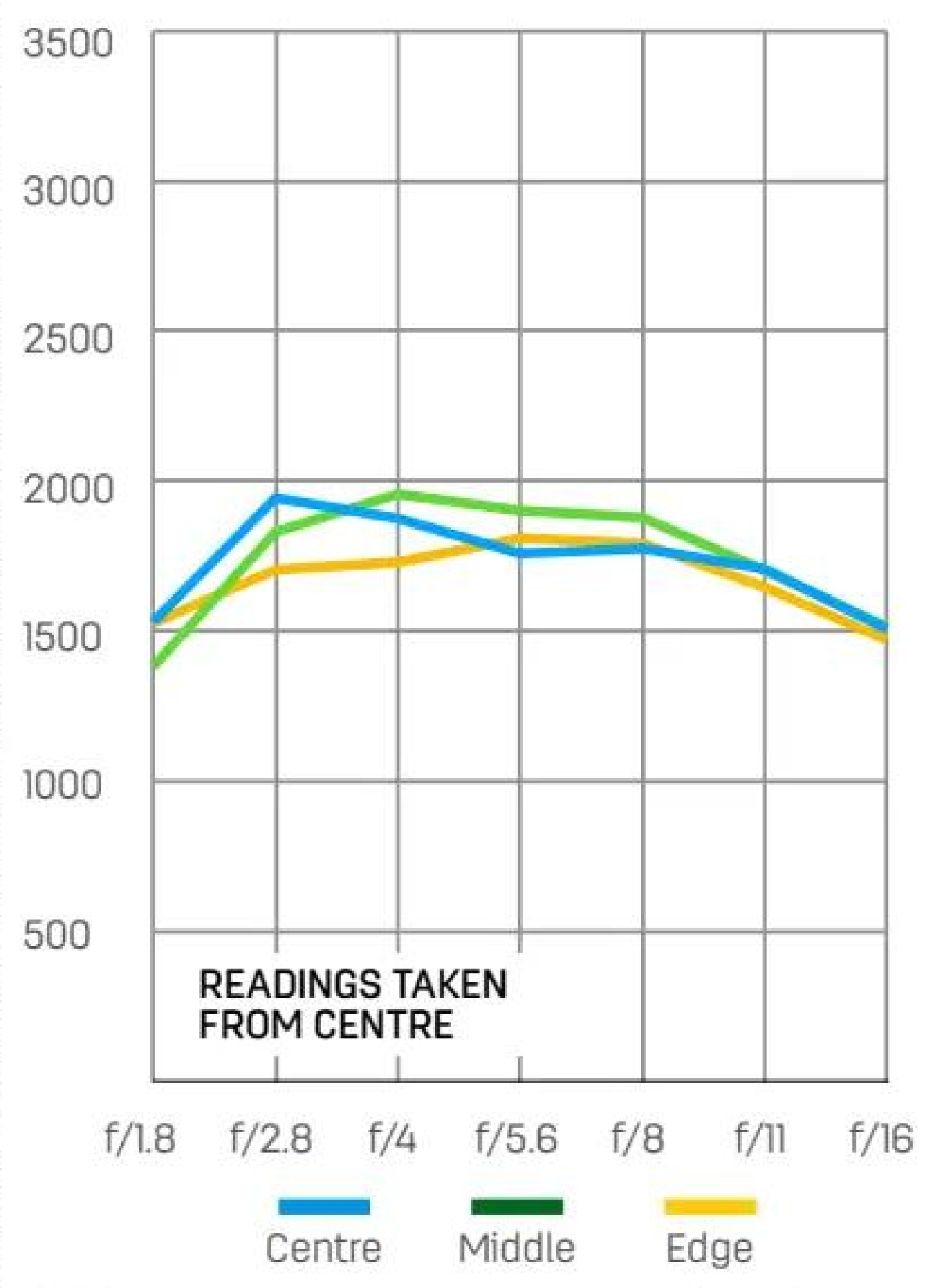
Smartly turned out with a strong, weather-sealed metal barrel and mounting plate, the Tamron is no lightweight at 700g. Like other Di lenses, it's designed for digital SLRs, which are more prone to ghosting and flare than film cameras. Indeed, it features two types of nano-structure coating which work in tandem to keep these aberrations to a minimum.

Further high-tech finery includes a fast and accurate ring-type ultrasonic autofocus system and Tamron's proprietary VC (Vibration Compensation) system.

Performance

Sharpness could be a little better at f/1.8, but it's certainly good enough. Despite the modest f/1.8 aperture rating, bokeh is excellent, matching the smoothness of many top-flight f/1.4 lenses and beating a few. Defocused points of light remain well-rounded.

SHARPNESS HIGHER IS BETTER



Wide-open, it's not quite as good as the Nikkor AF-S lens, but better than the Canon.

FRINGING (AT F/8) LOWER IS BETTER

Fringing	0.54

Levels of both axial and lateral chromatic aberrations are very minimal indeed.

DISTORTION NEARER 0 IS BETTER

Distortion	0.22

Pincushion distortion is very minor, less even than in the Nikon AF-S 85mm f/1.8.

VERDICT	
FEATURES	★★★★★
BUILD & HANDLING	★★★★½
PERFORMANCE	★★★★½
VALUE	★★★★½
OVERALL	★★★★½

TELEPHOTO ZOOMS

Extend your telephoto reach without overextending your finances. ***Matthew Richards*** *seeks out the best buys*

The first extra lens a photographer buys for their cameras is usually a telephoto. We've rounded up eight reasonably priced alternatives competing for your cash. They include lenses designed for full-frame cameras and some made specifically for smaller 'crop sensor' cameras with APS-C or Micro Four Thirds sensors.

A full-frame lens will give you more 'reach' on a crop-sensor camera, but lenses designed specifically for these smaller sensor sizes will tend to be cheaper and lighter, so if you own a Nikon, Pentax or Canon DSLR, you will need to decide which to go for.

If you have a Fujifilm X-mount camera or an Olympus or Panasonic mirrorless camera, the choice is easier because these stick to a single sensor size.

The other question is how much you're prepared to pay! Our winner may prove controversial, but it does highlight the dilemma between value and quality.

THE CONTENDERS

1	**Canon** RF 24-240mm f4-6.3 IS USM	£909/$1,086
2	**Fujifilm** XF 70-300mm f4-5.6 R LM OIS WR	£729/$799
3	**Tamron** SP 70-200mm f/2.8 Di VC USD G2	£1,249/$1,299
4	**Canon** EF 100-400mm f/4.5-5.6L IS II USM	£1,850/$2,050
5	**Nikon** DX 50-250mm f/4.5-6.3 VR	£379/$349
6	**Nikkor** Z 24-200mm f/4-6.3 VR	£849/$897
7	**Panasonic** PZ 45-175mm f/4-5.6 Power OIS	£350/$450
8	**Pentax** 55-300mm f/4.5-6.3 DA PLM WR	£400/$380
9	**Tamron** SP 70-300mm f/4-5.6 Di VC USD	£330/$450

Matt Anderson Photography / Getty

LOCK
100
70
50
35
24
Canon
24-240
FOCUS
CONTROL

CSC www.canon.co.uk

Canon RF 24-240mm F4-6.3 IS USM

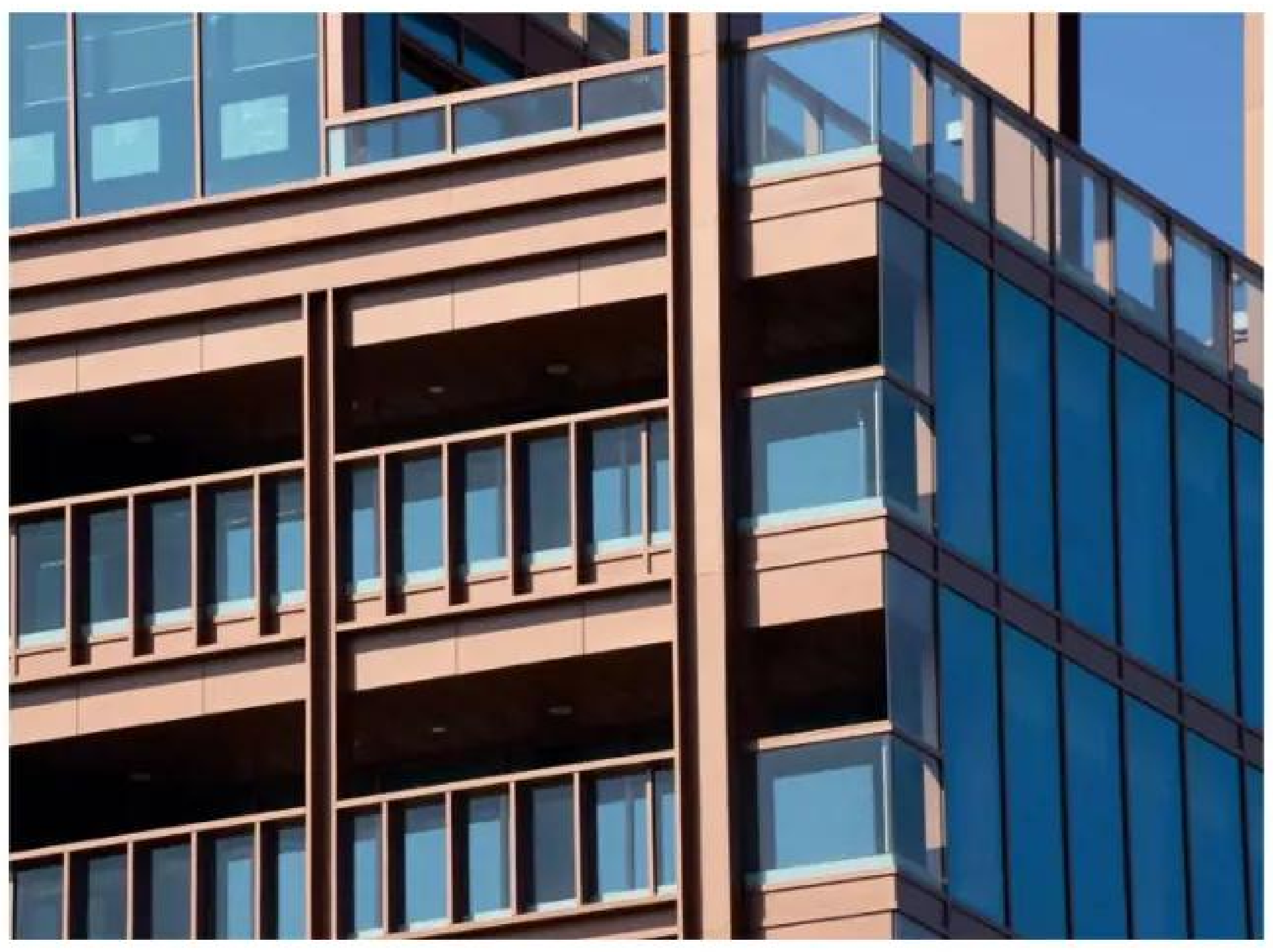
£909/$1,086

It sets new standards for full-frame focal ranges but how is its RF quality?

It's not the first time we've seen a full-frame lens with similar focal lengths, but the likes of the Canon EF 28-300 f/3.5-5.6L IS USM were positively monstrous by comparison – that particular lens added 1.67kg to your kit bag! At 750g the RF 24-240mm F4-6.3 IS USM is far kinder on your back, and while it does feel like some compromises in construction have been made, the body still feels tough enough for most situations. Welcome too is the metal lens mount, which lends an additional pro feel. The zoom and control rings are easy to reach and operate, making for an enjoyable handling experience.

Performance

This is where things get a little complicated. Clearly there is a lot of digital correction going on behind the scenes – without the default profile, applied vignetting and distortion is some of the worst we've seen! Yet in a single click all of that goes away and you're left with an acceptably sharp image. Corner-to-corner sharpness is impressive, as is chromatic aberration control. Bokeh is not a match for an f/1.4 prime, but the lens provided a surprisingly attractive background blur. AF speed is smooth and fast.



Without a correction profile enabled there is pincushion distortion in the vertical lines, shot at the long end. This is easily removed in RAW processing

Images by Peter Fenech

The RF 24-240mm F4-6.3 IS USM has an effective image stabilisation system, which is useful when shooting handheld at the longer focal lengths

SPECIFICATIONS

Elements/construction: 21 elements in 15 groups
Angle of view: 84° - 10°20
Max aperture: f/4
Min aperture: f/36
Min focus distance: 50cm
Mount: Canon RF
Filter size: 72mm
Length: 122.5mm
Diameter: 80.4mm
Weight: 750g

WE SAY...

It's a tough lens to review as the optics are supported by digital trickery, however, we don't think that matters. It works. For a full-frame lens this is an incredibly portable 10x zoom, which offers more than adequate image quality. It's sure to become a travel shooting favourite.

VERDICT

FEATURES	★★★★☆
BUILD & HANDLING	★★★★☆
PERFORMANCE	★★★★½
VALUE	★★★★½
OVERALL	★★★★½

10-300mm 1:4-5.6 R LM OIS WR Ø67
SUPER EBC XF
70
100
135
200
300
70-300
XF ZOOM

CSC www.fujifilm.com

Fujifilm XF 70-300mm f4-5.6 R LM OIS WR

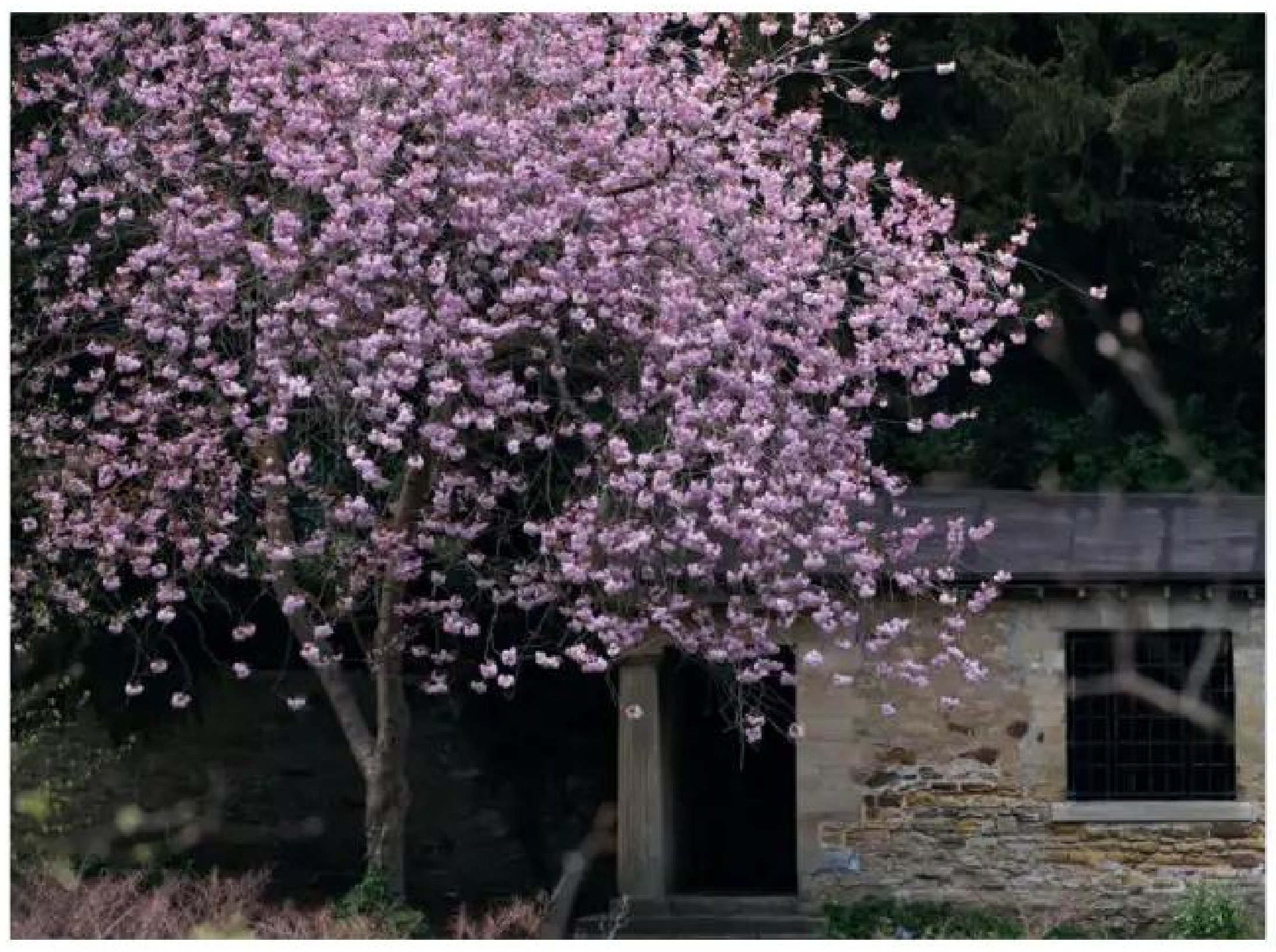
£729/$799

This zoom lens combines a wide focal range with surprising image quality

The first thing you notice about this camera is how lightweight it is. There are many 70-300mm lenses on the market, but not all of them have weather-sealing like this one does – denoted by the WR. The balance of construction quality and weight seems perfectly judged, meaning you can shoot with confidence in the elements, but still save your back, after a day of shooting. The zoom and focus rings have enjoyable resistance and are easy to grip. The setup was quite front-heavy when paired with the Fujifilm X-E4, but on an X-T4 or larger the weight distribution is likely more stable.

Performance

Sharpness is really good for a lens of this type, especially in the centre of the frame. More surprising is that this continues through the zoom range, with excellent detail even at 300mm. Resolution falls off at the corners, but it's still not a bad performance. Autofocus is speedy too, and while it can hunt occasionally, in good light it is smooth and accurate. The Linear Motor is quiet too, making the lens ideal for wildlife and sporting events. The variable aperture can limit use in low light, but the OIS system is effective, allowing sharp handheld images in most conditions.



The lens has an effective image stabilisation system, which allows handheld shots, even in lower light conditions, such as this overcast day

Images by Peter Fenech

The large zoom range and overall effective maximum focal length makes the lens ideal for distant subjects or for filling the frame, while allowing easy recomposition

SPECIFICATIONS

Elements/construction: 17 elements in 12 groups
Angle of view: 22.9°-5.4°
Max aperture: f/4-5.6
Min aperture: f/22
Min focus distance: 83cm
Mount: Fujifilm X
Filter size: 67mm
Length: 132.5mm
Diameter: 75mm
Weight: 580g

WE SAY...

While it is an enthusiast lens, this 70-300mm is far from a budget performer. It blends portability with excellent range and superior sharpness. When paired with the compatible XF 2x TC WR teleconverter you get a 914mm f/11 lens, which provides excellent value.

VERDICT

FEATURES	★★★★★
BUILD & HANDLING	★★★★½
PERFORMANCE	★★★★★
VALUE	★★★★½
OVERALL	★★★★½

CSC www.tamron.eu

Tamron SP 70-200mm f/2.8 Di VC USD G2

£1,249/$1,299

It's cheaper than its proprietary rivals, but does it measure up for professionals?

For professional photographers and advanced enthusiasts, a trio of f/2.8 zooms is seen as a standard for top-level images. The so-called 'Holy Trinity' lenses need to offer exceptional sharpness, reliable autofocus and a solid build, capable of handling professional use.

From the moment you pick this lens up, it feels every bit a pro-grade product. Fresh from the box, it was chilled to the touch – indicating a predominantly metal build and instilling confidence that it can withstand the hardest of knocks. The bundled lens hood is a little on the plasticky side, but it's nice to have it included in the price. All of the control rings are tough and easy to grip.

Performance

RAW files show how natural, yet impactful the contrast can be. Colours are lovely and the rendering of edges gives files an attractive crispness. Meanwhile, sharpness is impressive overall – when shooting at f/5.6 to f/8, centre detail, in particular, is excellent. The SP 70-200mm f/2.8 Di VC USD G2 suffers a little towards the edges though, especially when shooting wide open. There is a sudden drop-off in detail in the corners of the frame, which isn't terrible, however, it is noticeable.

At the wider aperture settings, the Tamron SP 70-200mm f/2.8 Di VC USD G2 produces silky out-of-focus areas, useful for portraits and close-up shots

While AF speed is excellent, on two occasions the lens would not confirm focus and we actually got an error message when using the Canon EF-EOS R adaptor

Images by Peter Fenech

SPECIFICATIONS

Elements/construction: 23 elements in 17 groups
Angle of view: 34°21'-12°21
Max aperture: f/2.8
Min aperture: f/22
Min focus distance: 0.95m
Mount: Canon EF, Nikon F
Filter size: 77mm
Length: 193.8mm
Diameter: 88mm
Weight: 1500g/1485g (Canon/Nikon)

WE SAY...

With speedy AF, tough but manageable construction and an effective VC stabiliser, the Tamron SP 70-200mm f/2.8 Di VC USD G2 offers a standout balance of price and quality.

VERDICT

FEATURES	★★★★★
BUILD & HANDLING	★★★★½
PERFORMANCE	★★★★★
VALUE	★★★★☆
OVERALL	★★★★½

Mount option: Canon EF

Canon EF 100-400mm f/4.5-5.6L IS II USM

£1,850/$2,050

The new twist-and-go model

THE Mk II edition of Canon's classic 100-400mm lens ditches the trombone-style, push-pull zoom mechanism, and adds a more conventional twist-action zoom ring. It nevertheless retains the tight/smooth adjustable friction damper, which helps to avoid zoom creep. Improved build quality includes the addition of weather-seals.

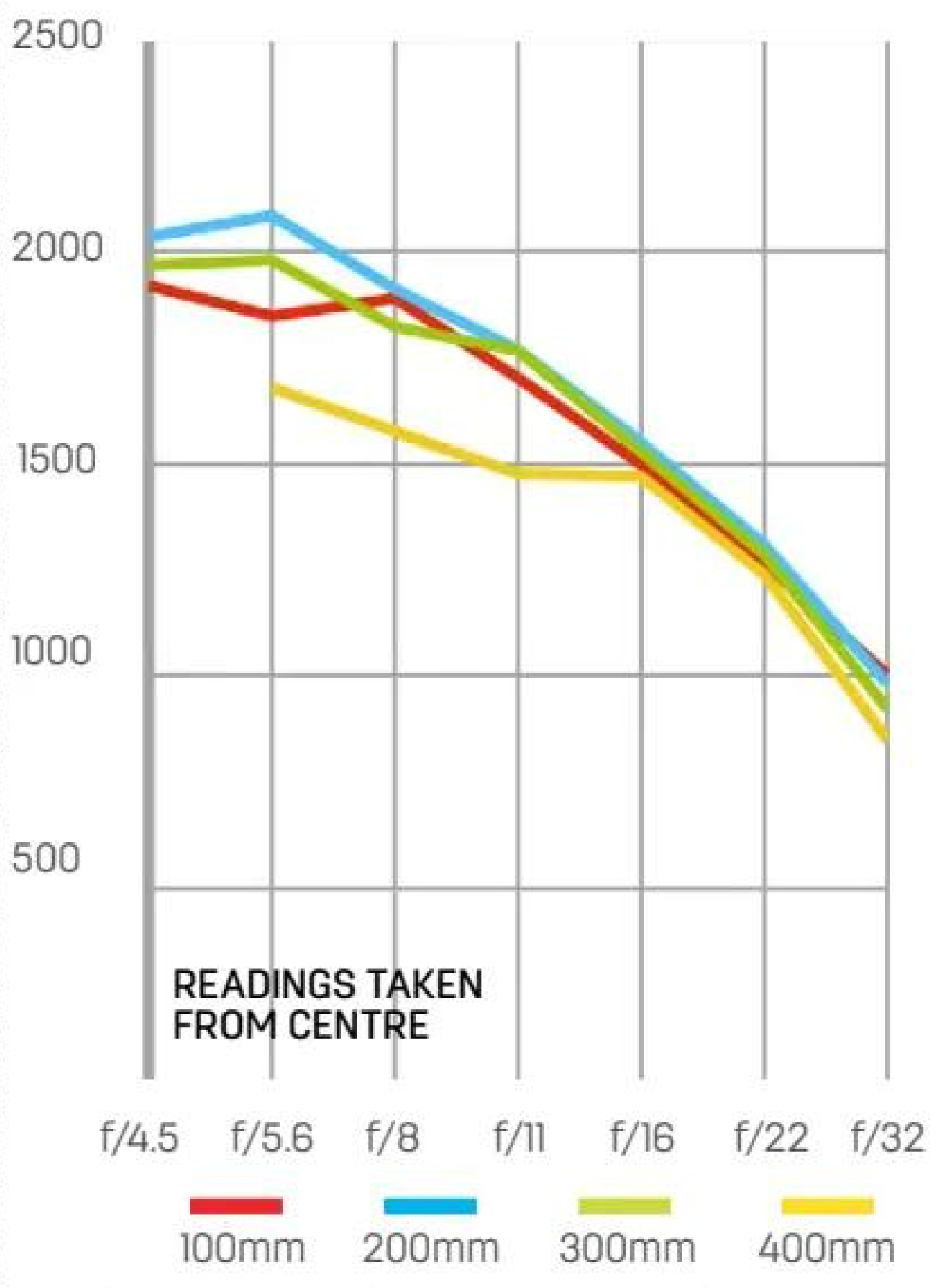
Good glass includes top-notch fluorite and Super UD (Ultra-low Dispersion) elements, with Air Sphere Coating for reducing flare and ghosting, and fluorine coatings on the front and rear elements.

The triple-mode image stabiliser has static, panning and exposure-only modes, the last of which makes it easier to track erratically moving subjects in the viewfinder. However, the ring-type ultrasonic autofocus system only has standard manual override, not a 'manual priority' mode.

Performance

Autofocus is fast and stabilisation lives up to its four-stop claims. Image quality is very good, and the drop in sharpness at the long end of the zoom range is less than in some competing lenses.

SHARPNESS HIGHER IS BETTER



Wide-aperture sharpness is excellent throughout almost the entire zoom range.

FRINGING (AT F/8) LOWER IS BETTER

Wide 2.44 **Mid** 0.57 **Tele** 0.03

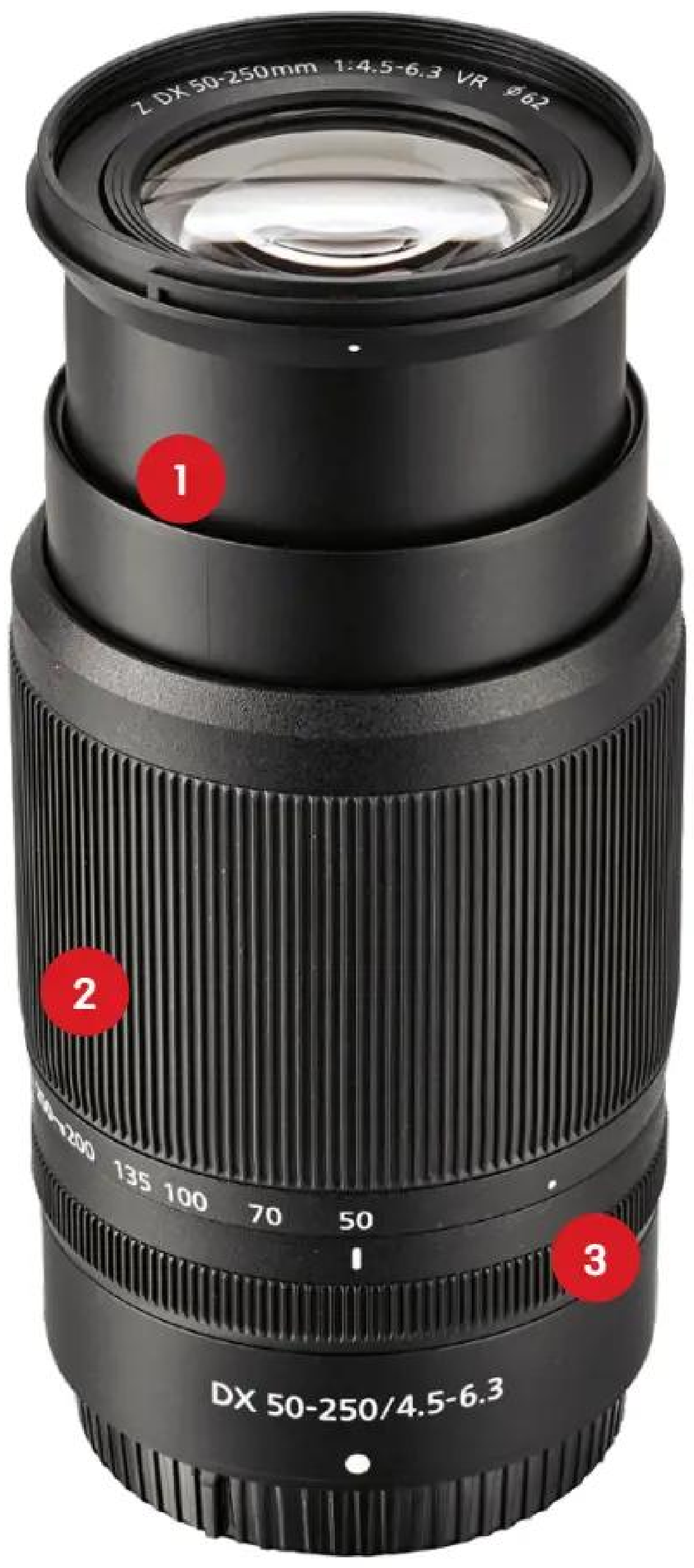
It's worse than average at 100mm, but negligible at mid to long zoom settings.

DISTORTION NEARER 0 IS BETTER

Wide -1.11 **Mid** 0.17 **Tele** 1.33

Both barrel and pincushion distortions are fairly low.

VERDICT	
FEATURES	★★★★☆
BUILD & HANDLING	★★★★½
PERFORMANCE	★★★★½
VALUE	★★★☆☆
OVERALL	★★★★☆



Mount option: Nikon DX

Nikon DX 50-250mm f/4.5-6.3 VR

£379/$349

Telephoto reach at a knockdown price

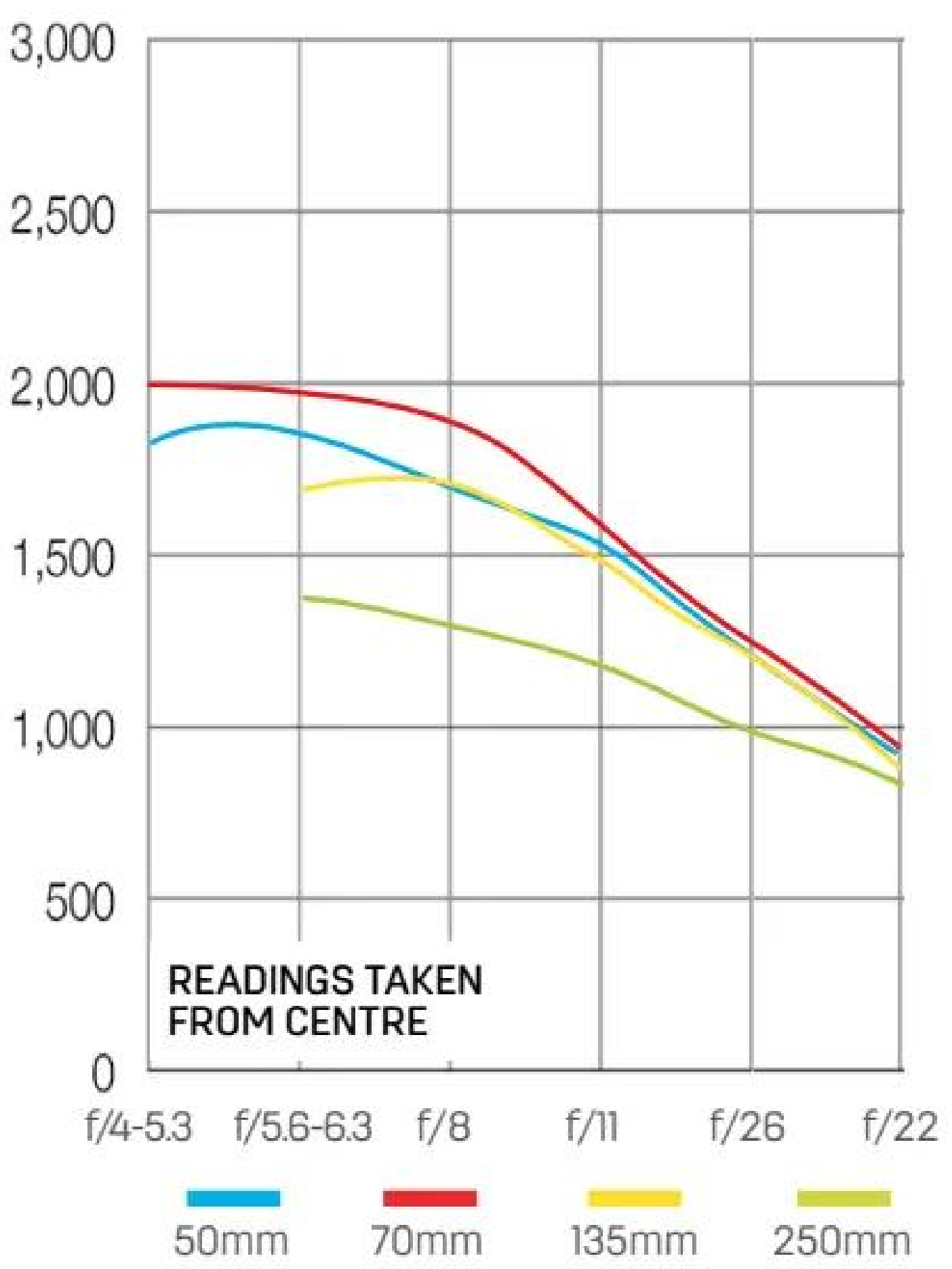
With a similar price to Nikon's AF-S DX 55-200mm VR lens for SLR cameras, this Z-mount zoom stretches further into telephoto territory, with an effective zoom range of 75-375mm and a regular 62mm filter thread [1].

Like the older AF-S lens as well as the Z 16-50mm, it has a retractable design that helps to keep the size down for stowage, this time with a retracted length of 110mm.

The build, long-end aperture and overall look and feel are almost the same as the Z 16-50mm, while the zoom ring is decently large and operates very smoothly [2]. With fast and silent AF, along with notable image quality and better 5-stop optical VR, overall performance is also very similar. As in the 16-50mm, the focus ring is electronically coupled to a stepping motor [3].

As with the Z 16-50mm, build quality is pretty reasonable for a kit zoom lens but performance is impressive in all respects. We'd buy the Z 50 as a kit with both lenses.

SHARPNESS HIGHER IS BETTER



There's plenty of sharpness on tap, but as with many telephoto zooms, it drops off a bit at the long end.

FRINGING (AT F/8) LOWER IS BETTER

Wide 0.26 **Mid** 0.27 **Tele** 0.8

There's very little colour fringing overall, best performance being at the short end of the zoom range.

DISTORTION NEARER 0 IS BETTER

Wide -0.14 **Mid** -0.1 **Tele** 0.03

Levels of distortion are virtually undetectable, at all focal lengths throughout the zoom range.

VERDICT	
FEATURES	★★★★☆
BUILD & HANDLING	★★★★☆
PERFORMANCE	★★★★½
VALUE	★★★★½
OVERALL	★★★★½

24-200/4-6.3
24
35
50
70
105

Mount option: Nikon Z

Nikkor Z 24-200mm f/4-6.3 VR

£849/$897

It has a range to make APS-C users jealous but how does the quality fare?

Together with the Canon RF 24-240 f/4-6.3 IS USM, this Nikkor lens represents a new breed of full-frame superzoom optics for mirrorless cameras. With a DSLR system, this type of zoom range would be unthinkable at the dimensions and weight found in these mirrorless successors – two characteristics in which the Nikkor Z 24-200mm f/4-6.3 VR excels. The build is a touch on the plasticky side, but it still feels capable, despite the highly portable nature of the barrel. At 570g, the lens feels like a feather, when compared with a wider aperture zoom, such as a 70-200mm f/2.8. The focus/control ring is a little narrow for our taste, but the zoom control is easy to find with your eye to the camera and smooth and quick to operate.

Performance

It's tough to set the parameters for quality assessment as there is some digital trickery at work behind the scenes. Correction profiles are embedded in RAW files, so what you see is actually a shot with reduced distortion and chromatic aberration. However, functionally speaking, both are well controlled. Sharpness at the edges suffers a little, but centre detail is very good. Colours pop nicely and contrast is high. AF speed is also impressive.

SPECIFICATIONS

Elements/construction: 19 elements in 15 groups
Angle of view: 84° to 12° 20'
Max aperture: f/4
Min aperture: f/36
Min focus distance: 0.5cm
Filter size: 67mm
Length: 114mm
Diameter: 76.5mm
Weight: 570g

WE SAY...

While this might not be the go-to lens for every pro assignment, there is no denying that it represents a fantastic balance of quality, focal range and portability.

VERDICT	
FEATURES	★★★★★
BUILD & HANDLING	★★★★☆
PERFORMANCE	★★★★½
VALUE	★★★★★
OVERALL	★★★★½

45-175
HD
POWER ZOOM
T
W
LUMIX G
VARIO 1:4.0-5.6/45-175
ASPH.
Φ46
POWER O.I.S.

Digital Camera
★★★★★
BEST FOR MICRO 4/3

Mount option: Micro Four Thirds

Panasonic PZ 45-175mm f/4-5.6 Power OIS

£350/$450

Good for stills, great for movies

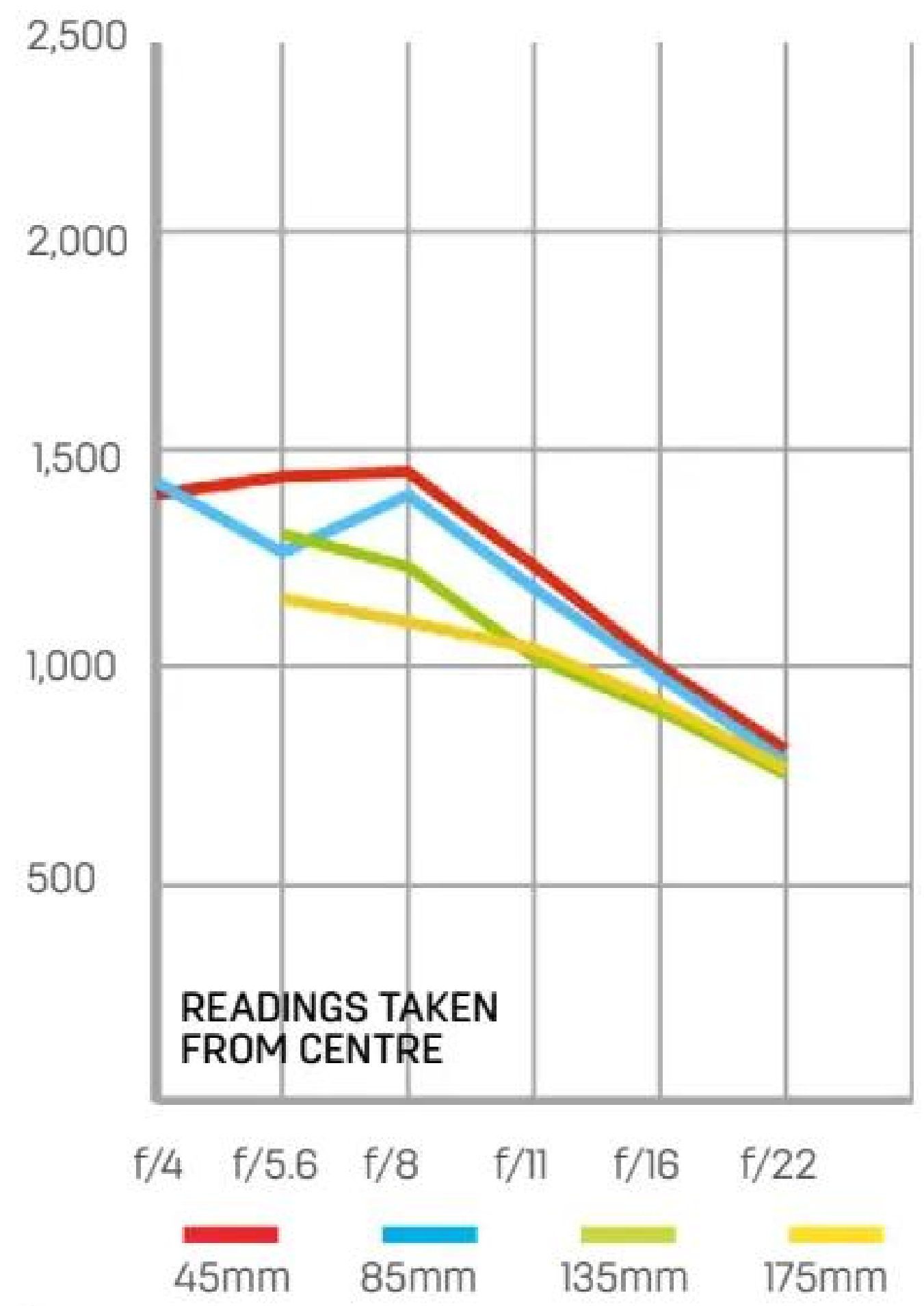
Pairing well with Panasonic's Micro Four Thirds cameras, this lens is ideally suited to both stills and video capture. Making the most of the MFT system's 2x crop factor, it delivers an 'effective' 90-350mm zoom range in a small and light package. Even without a retracting design, the lens is only 90mm in physical length and, more remarkably, retains a constant length throughout the zoom and focus ranges. At 210g, it's the lightest lens in this test group, despite having a metal mounting plate.

A bonus for movie capture is the lens's powered zoom mechanism. You can operate it either by twisting the zoom ring or via the W/T (Wide/Tele) switch towards the rear of the barrel. Both zoom control options, as well as the focus ring, are electronically rather than mechanically coupled.

Performance

The optical stabiliser is worth three stops, but outright sharpness is disappointing. There's practically zero fringing or distortion, thanks to MFT in-camera corrections, and nano-structure coatings help to keep ghosting and flare at bay.

SHARPNESS HIGHER IS BETTER



Sharpness is lacklustre and doesn't improve when stopping down.

FRINGING (AT F/8) LOWER IS BETTER

Wide 0.74 **Mid** 1.02 **Tele** 0.44

There's very slight fringing at mid-zoom settings and even less at either end.

DISTORTION NEARER 0 IS BETTER

Wide -0.09 **Mid** -0.04 **Tele** 0.01

With the help of in-camera corrections, it's pretty much a distortion-free lens.

VERDICT	
FEATURES	★★★★☆
BUILD & HANDLING	★★★★☆
PERFORMANCE	★★★½☆
VALUE	★★★½☆
OVERALL	★★★★☆

Digital Camera
★★★★★
BEST FOR PENTAX

Mount option: Pentax K

Pentax 55-300mm f/4.5-6.3 DA PLM WR

£400/$380

Refined in use, restrained in size

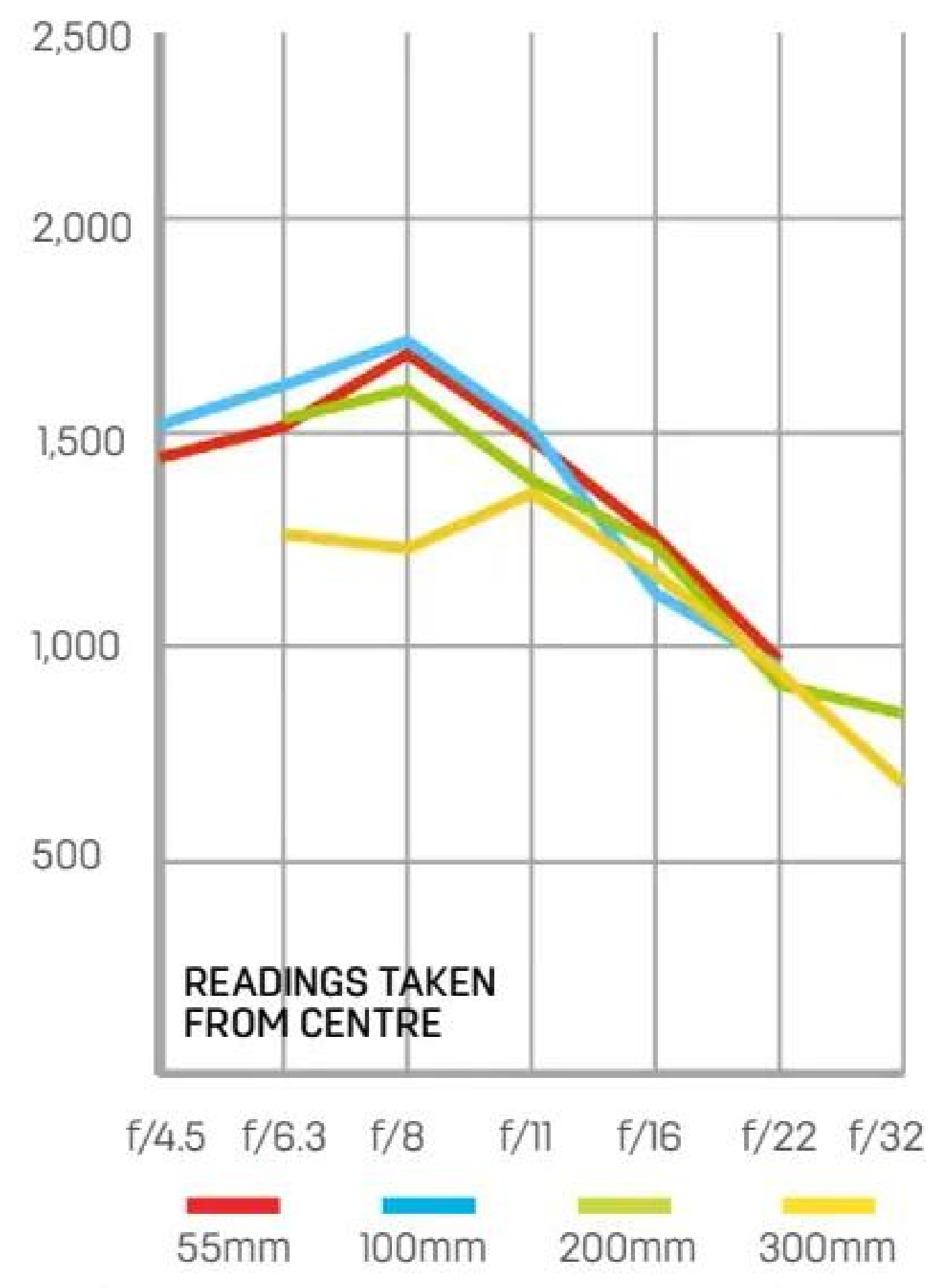
Like the Nikon 55-200mm lens on test, this Pentax model has a crafty retractable design that measures only 89mm in length when 'folded down'. And yet, unlike the APS-C format Canon, Fujifilm and Nikon lenses in the group, it delivers a full 300mm telephoto length at its maximum zoom setting, equating to 450mm on a full-frame camera.

The lens' autofocus system follows a current trend for a 'pulse' stepping motor mechanism. It's virtually silent in operation – which makes a refreshing change from some of the other lenses in Pentax's line-up. There's no optical stabiliser fitted, the lens relying instead on sensor-shift stabilisation in the host camera body. Build quality is very good and features weather-seals.

Performance

In terms of performance, the lack of optical stabilisation isn't a drawback. Shooting with a Pentax K70 body, we found that the camera-based stabilisation gave a four-stop benefit. There's a slight drop in sharpness at the long end of the zoom range but image quality is very good overall.

SHARPNESS HIGHER IS BETTER



Levels of sharpness remain very good at the widest apertures, but drop a little at 300mm.

FRINGING (AT F/8) LOWER IS BETTER

Wide 1.83 **Mid** 0.32 **Tele** 2.26

There's only minor fringing at each end of the range, and it's negligible in the middle.

DISTORTION NEARER 0 IS BETTER

Wide -1.68 **Mid** 0.92 **Tele** 1.29

The swing from barrel to pincushion is about average for this class of telephoto.

VERDICT

FEATURES	★★★★☆
BUILD & HANDLING	★★★★½
PERFORMANCE	★★★★½
VALUE	★★★★½
OVERALL	★★★★½

Digital Camera
★★★★★
BEST FOR SONY
Digital Camera
★★★★★
GREAT VALUE

Mount option: Canon EF Nikon FX Sony A

Tamron SP 70-300mm f/4-5.6 Di VC USD

£330/$450

Conventional, but in a good way

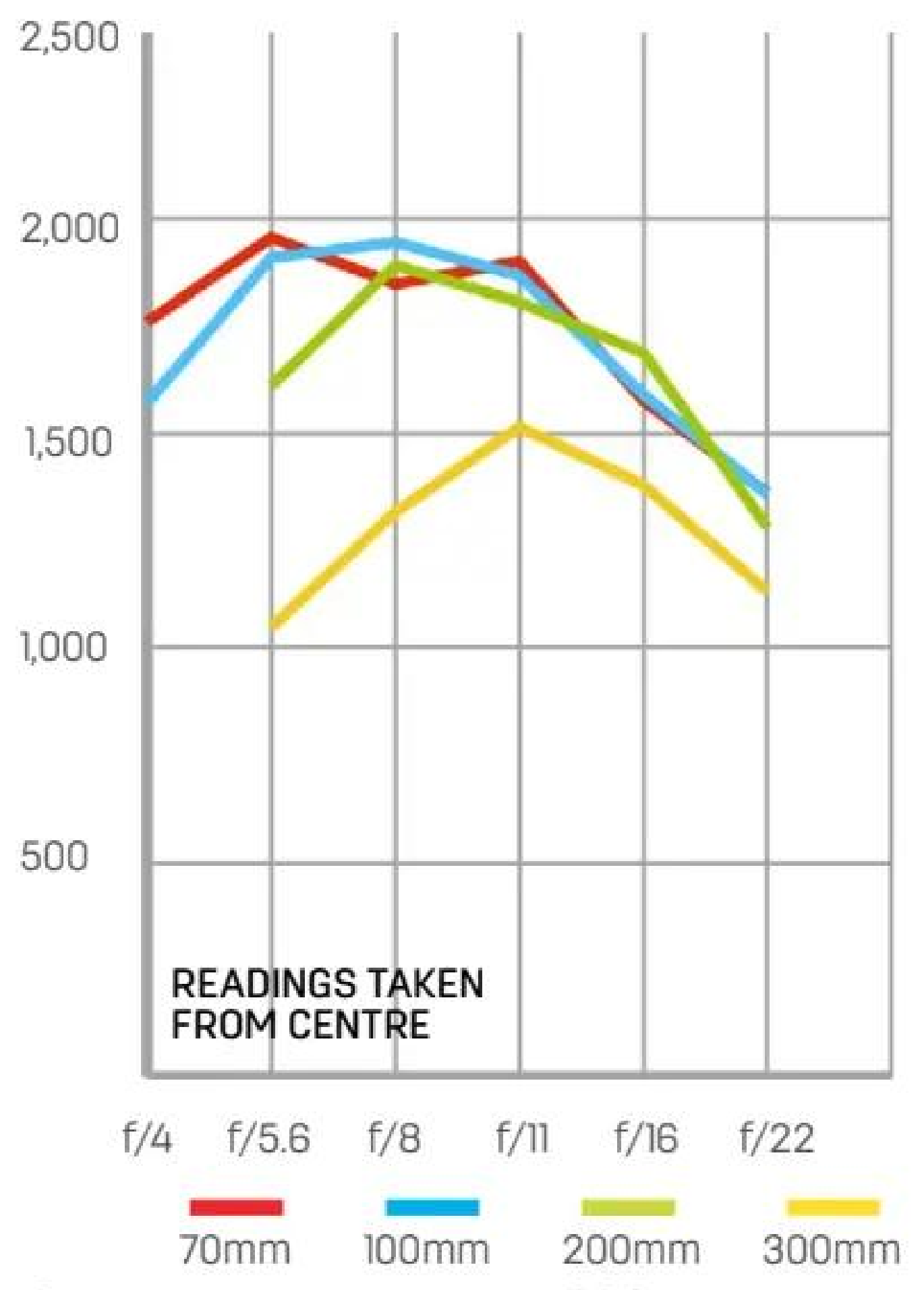
Tamron's 70-300mm VC USD is becoming a bit of a minority item, with its ring-type ultrasonic autofocus system. That's no bad thing, as AF performance is fast and quiet, and comes complete with manual override. Many will also prefer the mechanical coupling for the focus ring, which comes with a focus distance scale beneath a viewing panel.

The Canon- and Nikon-mount editions feature Tamron's proprietary VC (Vibration Compensation) stabilisation system, while the Sony A-mount version relies on in-camera stabilisation. The large zoom ring at the front of the lens operates smoothly. Positioned towards the rear, the focus ring doesn't rotate during autofocus, so it doesn't impair handling. As with most Tamron lenses and not so many own-brand optics, it comes complete with a hood.

Performance

Helped by the inclusion of both an LD (Low Dispersion) and an XLD (eXtra Low Dispersion) element, levels of sharpness and contrast are very pleasing, and colour fringing is well-controlled.

SHARPNESS HIGHER IS BETTER



Close-range sharpness at 300mm drops off, but it's very good at longer distances.

FRINGING (AT F/8) LOWER IS BETTER

Wide 1.12 **Mid** 1.42 **Tele** 2.23

There's only minor colour fringing, even towards the extreme corners of the frame.

DISTORTION NEARER 0 IS BETTER

Wide -0.34 **Mid** 2.01 **Tele** 1.97

Barrel distortion is negligible at 70mm, and there's only minor pincushion otherwise.

VERDICT

FEATURES	★★★★½
BUILD & HANDLING	★★★★½
PERFORMANCE	★★★★☆
VALUE	★★★★★
OVERALL	★★★★½

Shutterstock

MACRO LENSES

Mount one of these on your camera and you'll see the world in close detail

Most macro prime lenses have a magnification ratio of 1.0x or 1:1 – but what does that actually mean? In a nutshell (or something of a similarly small size), when you move in close using the lens's shortest available focus distance, objects are reproduced on the camera's image sensor at life size. Something measuring just 36 x 24mm would completely fill the image sensor of a full-frame camera; it's just around 22 x 15mm or 17 x 13mm if you're shooting with an APS-C or a Micro Four Thirds body respectively.

Bear in mind how much larger an image is when you view it on screen or in print, compared with the size of the camera's sensor, and the scope for enlargement is incredible. Tiny garden bugs can look like giant creatures, and you can see levels of fine detail that are invisible to the naked eye. Let's take a closer look at the leading macro contenders.
Matthew Richards

THE CONTENDERS

1 **Canon** RF 100mm f/2.8L Macro IS USM	£1,449/$1,399
2 **Nikon** Z MC 105mm f/2.8 VR S	£999/$997
3 **Nikkor** Z 50mm f/2.8 Macro	£604/$597
4 **Sony** FE 50mm f/2.8 Macro	£500/$500
5 **Irix** 150mm f/2.8 Macro 1:1 Dragonfly	£499/$595
6 **Samyang** 100mm f/2.8 ED UMC Macro	£389/$499
7 **Sigma** 105mm f/2.8 DG DN Macro | A	£699/$799
8 **Tamron** SP 90mm f/2.8 Di VC USD Macro	£649/$649

CANON LENS RF 100mm F2.8 L MACRO IS USM
SA CONTROL
Canon
100
0.5m-∞
0.26m-0.5m
FULL

CSC www.canon.co.uk

Canon RF 100mm F2.8L MACRO IS USM

£1,449/$1,399

This short telephoto prime has appeal beyond the macro photography genre

Lenses such as this demonstrate the advantages of the mirrorless design. For its size and optical layout, the RF 100mm F2.8L MACRO IS USM is lightweight and perfectly balanced on an EOS R5/R6 body, making it possible to comfortably shoot one-handed if necessary. The focus, SA control and forward control rings are sensibly placed and smooth to operate, giving accurate fine-tuning. Although it has a plastic finish, the barrel feels tough and up to pro standards.

Performance

Images are exceptionally crisp, revealing plenty of fine detail. There are no unpleasant aberrations to speak of and performance is well-maintained across the frame, at all apertures. The SA (Spherical Aberration) Control is an unusual feature, but there are some genuine applications – the soft-focus of the negative position is great for dreamy portraits, while the positive settings produce contrasty bokeh that lends a creative style. It's not to be overused but adds to the feature spec. Autofocus is lightning fast, even at maximum magnification, while the 5-stop IS (greater on pro bodies) is effective.

You won't want to apply it to all of your images, but the SA ring allows interesting and unique styling to macro and portrait shots, broadening creative possibilities

A standout feature is the magnification of 1.4x – before this required extra accessories. With the hybrid Image Stabilisation system, handholding is possible too

SPECIFICATIONS

Elements/construction: 17 elements in 13 groups
Minimum focus distance: 0.26m
Angle of view: 24°
Max aperture: f/2.8
Min aperture: f/32
Mount: Canon RF Mount
Filter size: 67mm
Dimensions (dia x length): 81.5x148mm
Weight: 730g

WE SAY...

It can be tricky to judge the value of a lens – what is expensive to one user is well-priced to another. This isn't a cheap optic, but its versatility and feature set make it useful in a broad range of shooting scenarios, justifying the price tag. It's difficult to find a flaw to discuss, although the Nikon Z MC 105mm f/2.8 VR S is still over £400 cheaper.

VERDICT

FEATURES	★★★★★
BUILD & HANDLING	★★★★★
PERFORMANCE	★★★★☆
VALUE	★★★★½
OVERALL	★★★★½

NIKKOR Z MC 105mm 1:2.8 VR S ⌀62
1:
1.4 1.2 1
DISP
L-Fn
NIKKOR
MC 105/2.8 S
A M

CSC www.nikon.co.uk

Nikon Z MC 105mm f/2.8 VR S

£999/$997

This macro powerhouse offers features and image quality in equal measure

The Nikkor Z lens range is growing rapidly and we're starting to see more specialised models. As you might expect from a £1,000 optic the build quality is designed to withstand the rigours of professional use, and it feels every bit the high-end product. As with other Z-mount lenses in its class however, it is surprisingly lightweight regardless and we'd happily pack it on a 'just in case' basis, without fear of a back injury. The controls are easy to use and the textured rings are comfortable to operate. Once again with a Z range lens we're uncertain if the OLED screen is just adding unnecessary size to the barrel, but some photographers will appreciate it.

Performance

We can't fault the image quality here – it's simply stellar. Details are bitingly crisp, which really benefits textured macro subjects and makes the most of the high-res sensors of the Z camera line-up. This sharpness extends to the very edges of the frame, at all aperture settings. Distortion and chromatic aberration are negligible while ghosting and flare is beautifully controlled – the ARNEO and Nano Crystal Coatings successfully work their magic. AF is also quick, silent and smooth, making it ideally suited to insect photography.

The AF system copes well with fast moving subjects, such as this bee. The motor demonstrates near silent operation too, so discreet shooting is possible

The Nikon Z MC 105mm f/2.8 VR S creates images with impactful but natural colour rendition, making it ideal for flower photography and portraiture

SPECIFICATIONS

Elements/construction: 16 elements in 11 groups
Minimum focus distance: 0.45cm
Angle of view: 23°
Max aperture: f/2.8
Min aperture: f/32-51
Mount: NikonZ
Filter size: 62mm
Dimensions (dia x length): 85x140mm
Weight: 630g

WE SAY...

Overall this is a superb lens. It costs a lot more than the Z MC 50mm lens but we feel it still offers great value. Build and handling make it a joy to use and image quality is a testament to Z-Series engineering. One of the best macro lenses currently on the market.

VERDICT

FEATURES	★★★★★
BUILD & HANDLING	★★★★★
PERFORMANCE	★★★★★
VALUE	★★★★★
OVERALL	★★★★★

Z 50mm 1:1.8 S ø62
50/1.8 S
A
M

CSC www.nikon.co.uk

Nikkor Z 50mm f/2.8 Macro

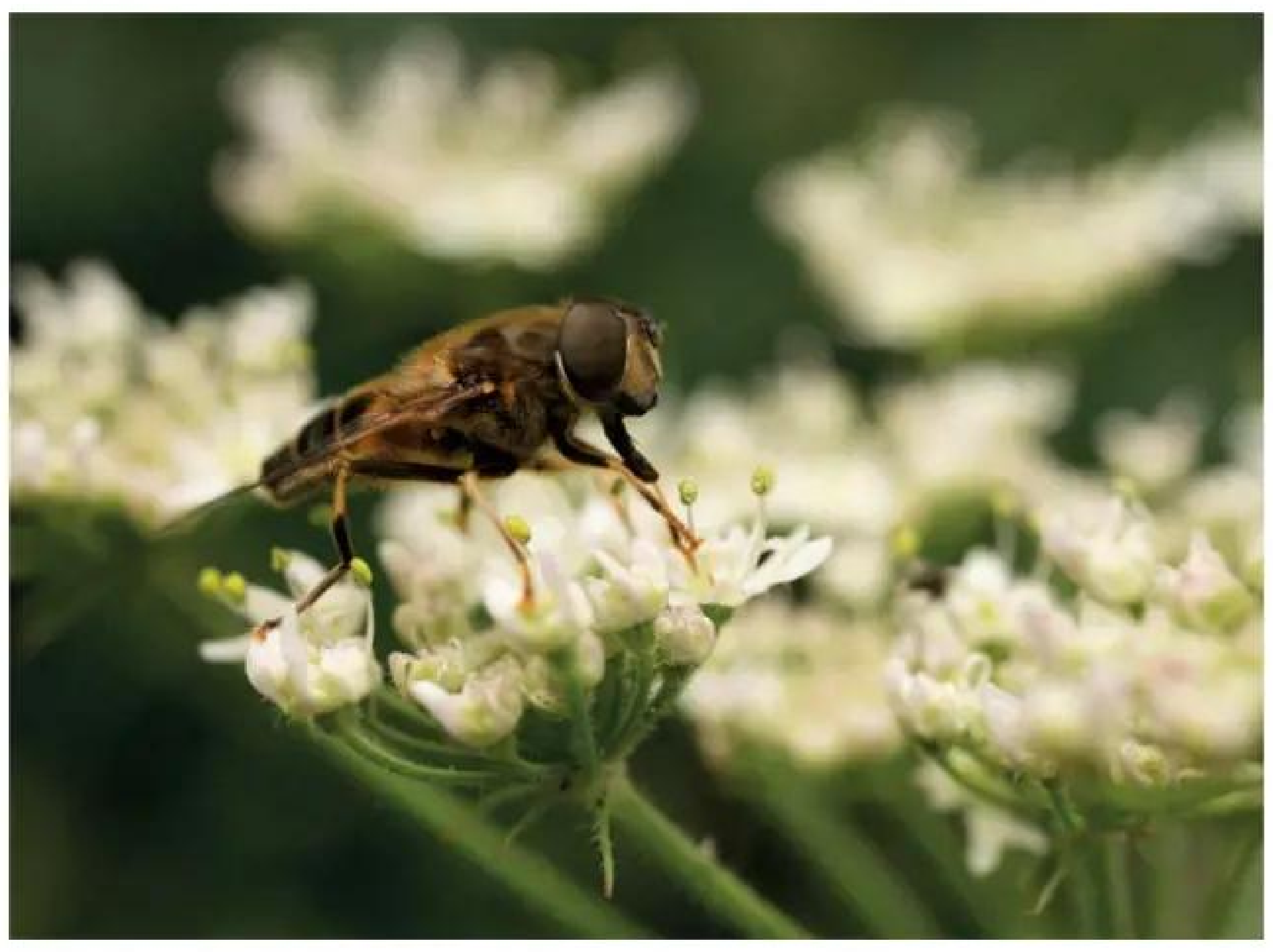
£604/$597

Nikon adds a potential must-have optic to its line of Z-series glass

We loved the Nikkor Z MC 105mm f/2.8 VR S, but our only criticism was the added cost over this 50mm smaller sibling. The Z 50mm f/2.8 Macro is lightweight and its small size means there's no reason not to take it everywhere you go. The focus ring is manageable, though the extending design is a drawback when set up on a tripod as frequent position adjustment is needed. While not incredibly solid, we have no complaints regarding the user experience.

Performance

Once again, Nikon has created a beautifully sharp lens. The glass is able to resolve a lot of detail, while contrast is punchy, yet natural. Colours are also nicely rendered with no visible shifts, which is useful when shooting insect or plant life subjects. Bokeh is lovely too, with creamy, rounded highlights and minimal cat's eye. Be aware that maximum f/stop varies at different focusing distances, however, admitting significantly less light at macro settings. AF speed is more than enough for most circumstances, but the electronic MF mechanism is slow to work. That makes it great for precision shots, but frustrating in other circumstances.



The 50mm focal length means you have to get quite close to smaller subjects to achieve frame-filling images. However, it does offer a unique perspective

Even at close distance, the resolution remains high with lots of contrast, detail and gorgeous colour rendition. With no image stabiliser, handheld shots rely on IBIS

SPECIFICATIONS

Elements/construction: 10 elements in 7 groups
Minimum focus distance: 47cm
Angle of view: 47°
Max aperture: f/2.8
Min aperture: f/22
Mount: Nikon Z
Filter size: 46mm
Dimensions (dia x length): 46x66mm
Weight: 260g

WE SAY...

The Nikkor Z MC 105mm f/2.8 VR S is unquestionably a high-quality lens. It produces gorgeous-looking images and makes for a brilliant all-rounder optic with a useful macro function. The wider FOV won't suit everyone and all subjects, of course. At over £600, it is expensive for an f/2.8 standard lens, but this is an optic you can fall in love with over time.

VERDICT

FEATURES	★★★★½
BUILD & HANDLING	★★★★★
PERFORMANCE	★★★★½
VALUE	★★★★½
OVERALL	★★★★½

1
2
3
FE 2.8/50 MACRO
∞–0.3m FULL 0.3m–0.16m
AF MF
E-mount

MACRO PRIME LENS www.sony.co.uk

Sony FE 50mm f/2.8 Macro £500/$500

A standard prime that fully lives up to its macro billing

There have been 50mm 'macro' lenses from the likes of Canon and Zeiss that, while giving a natural perspective with a full-frame SLR, don't deliver the full macro benefit. Instead they only offer a maximum magnification ratio of 0.5x at their closest focus distances.

Like Sony's older A-mount 50mm macro, this new E-mount optic boasts 1.0x magnification, reproducing small objects at full life-size on the image sensor.

Build & handling

Although the lens is compact and light, it feels well-built and fairly robust. It lacks a weather-sealed mount but is dust- and moisture-resistant. The inner barrel doesn't rotate during focusing but does extend at shorter focusing distances, revealing calibrated markings for focus distance and magnification. No lens hood is supplied, but the front element is deeply recessed within the inner barrel, helping to guard against ghosting and flare.

Unusually for a relatively short-focal-length macro lens, there's a focus limiter switch that can lock out the short or long ends of autofocus travel. There's also a handy focus-hold button.

Manual focusing is usually preferable in macro photography, so the smooth-action, fly-by-wire manual focusing system is a bonus. It offers excellent precision with the availability of fine adjustments, aided by the magnified focusing view available in Sony compact system cameras.

Performance

The autofocus system is highly accurate but rather slow. For close-up shots, AF speed can be further hampered by hunting, so the limiter switch earns its keep. Wide-open at f/2.8, there's a little vignetting and a slight drop in sharpness, but the quality of bokeh is pleasing.

Sharpness is excellent from f/4 to f/11, but macro photographers might be disappointed that it drops off at f/16 – and that f/16 is the narrowest available aperture.

Matthew Richards

1

The inner barrel extends at shorter focus distances, to as little as 4.5cm from the subject in full 1.0x macro shooting.

2

On-board controls include AF/MF and autofocus limiter switches, as well as a focus hold button.

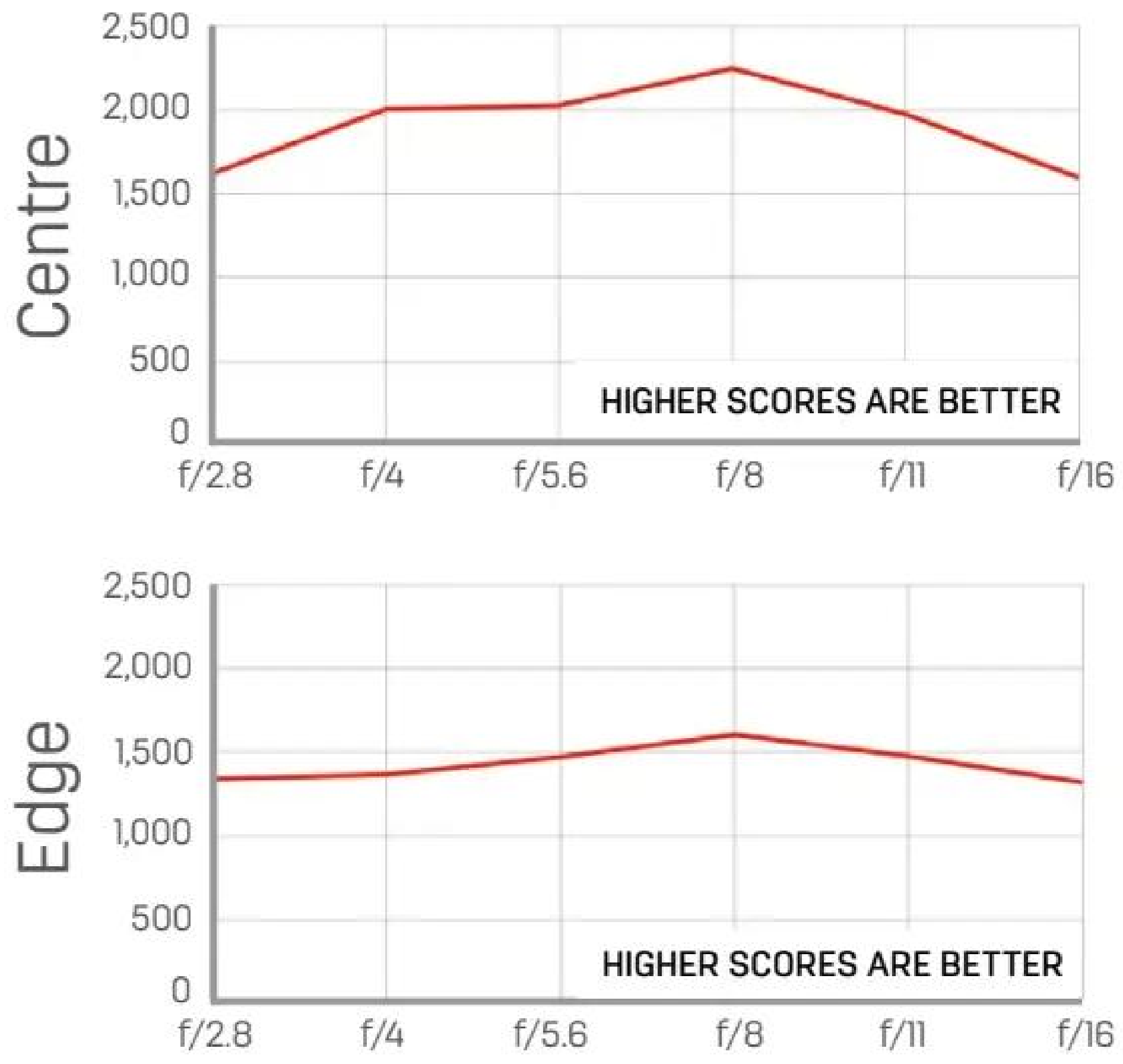
3

Eight optical elements are arranged in seven groups, which include an aspherical front element and an ED (Extra-low Dispersion) element.

SPECIFICATIONS

Full-frame compatible _ Yes
Effective focal length _ 50mm (75mm APS-C)
Image Stabiliser _ No
Minimum focus distance _ 0.16m
Max magnification factor _ 1.0x
Manual focus override _ Yes
Focus limit switch _ Yes
Internal focus _ No
Filter size _ 55mm
Iris blades _ 7
Weather seals _ Partial
Supplied accessories _ Caps
Dimensions (dia x length) _ 71 x 71mm
Weight _ 236g

SHARPNESS



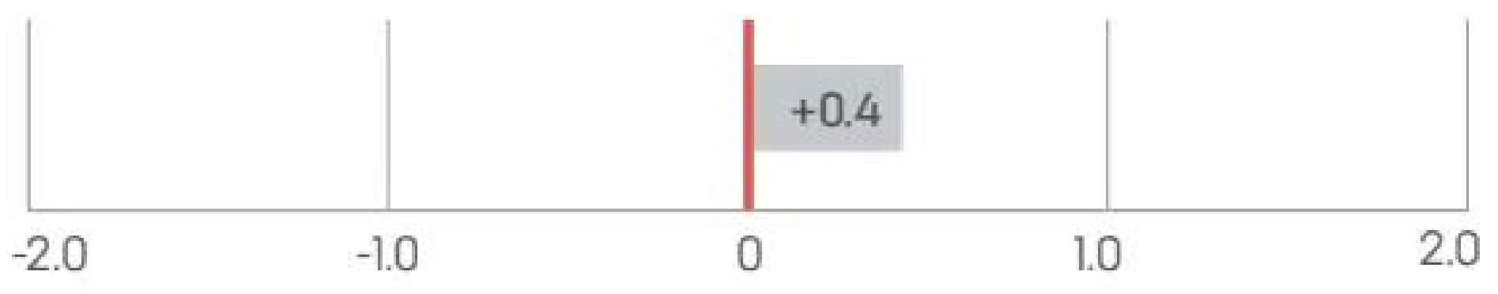
Between the two extremes of the aperture range, these graphs show that the lens captures excellent levels of fine detail.

FRINGING NEARER 0 IS BETTER

f/2.8 0.36 f/5.6 0.52 f/16 0.75

Colour fringing is negligible: it's practically imperceptible across the entire image frame.

DISTORTION NEARER 0 IS BETTER



There's the very slightest hint of barrel distortion, but it's pretty much unnoticeable.

WE SAY...

The Sony FE 50mm f/2.8 Macro works very well as both a 'standard' and a macro prime lens, with excellent handling and very good overall image quality.

VERDICT

FEATURES	★★★★½
BUILD & HANDLING	★★★★½
IMAGE QUALITY	★★★★½
VALUE	★★★★
OVERALL	★★★★½

Digital Camera ★★★★★ BEST FOR PENTAX

Irix 150mm f/2.8 Macro 1:1 Dragonfly

£499/$595

It really goes the distance

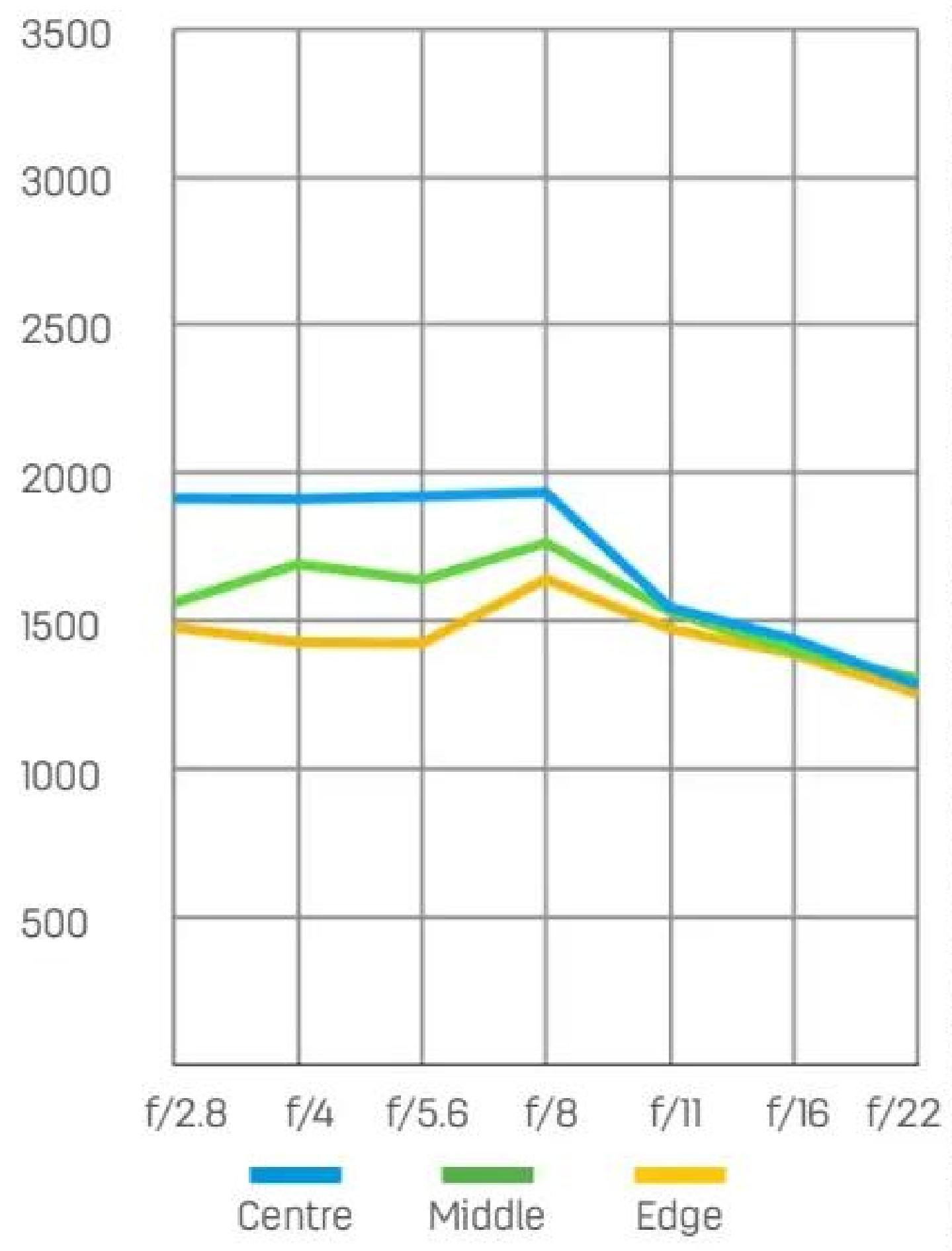
Sigma's 150mm macro lens was a good performer, but it has been discontinued, clearing the stage for this Irix full-frame compatible newcomer. The build quality is impeccable, based on high-quality optical elements and a weather-sealed magnesium alloy barrel. The 1.0x macro working distance is longer than with any other lens on test, at 17.5cm.

Like the Samyang macro lens, the Irix is manual-focus, but includes all the necessary electronics for camera-driven aperture control and viewfinder focus indicator lamps in all three fits: Canon EF, Nikon F and Pentax K.

Performance

The long-travel focus ring operates smoothly and has a locking mechanism. However, ultra-fine adjustments for macro shooting are more fiddly than with the Samyang lens. Image quality is excellent.

SHARPNESS HIGHER IS BETTER



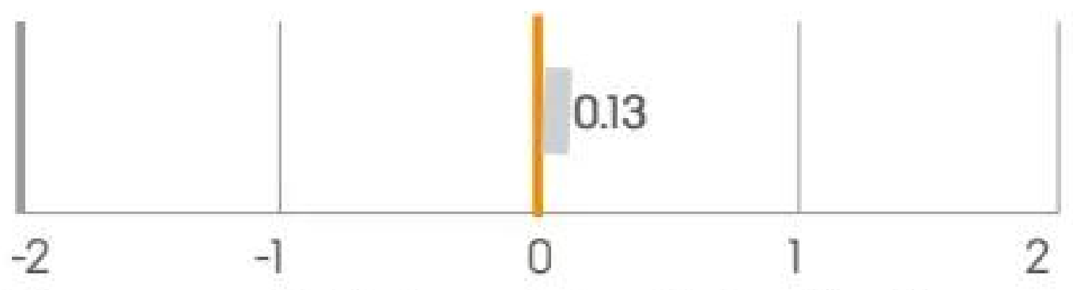
Unusually, sharpness across the frame barely drops off at all when shooting wide-open.

FRINGING LOWER IS BETTER

Fringing	0.63

Colour fringing is consistently minimal throughout the entire aperture range.

DISTORTION NEARER 0 IS BETTER



The amount of pincushion distortion is so slight that it's generally impossible to spot.

VERDICT

FEATURES	★★★★½
BUILD & HANDLING	★★★★½
PERFORMANCE	★★★★½
VALUE	★★★★½
OVERALL	★★★★½

Digital Camera ★★★★★ BEST FOR FUJIFILM

Mount options: Canon EF | Fujifilm X | Nikon FX | Pentax K | Samsung NX | Sony A | Sony E | Four Thirds | Micro Four Thirds

Samyang 100mm f/2.8 ED UMC Macro

£389/$499

It's a mostly manual macro

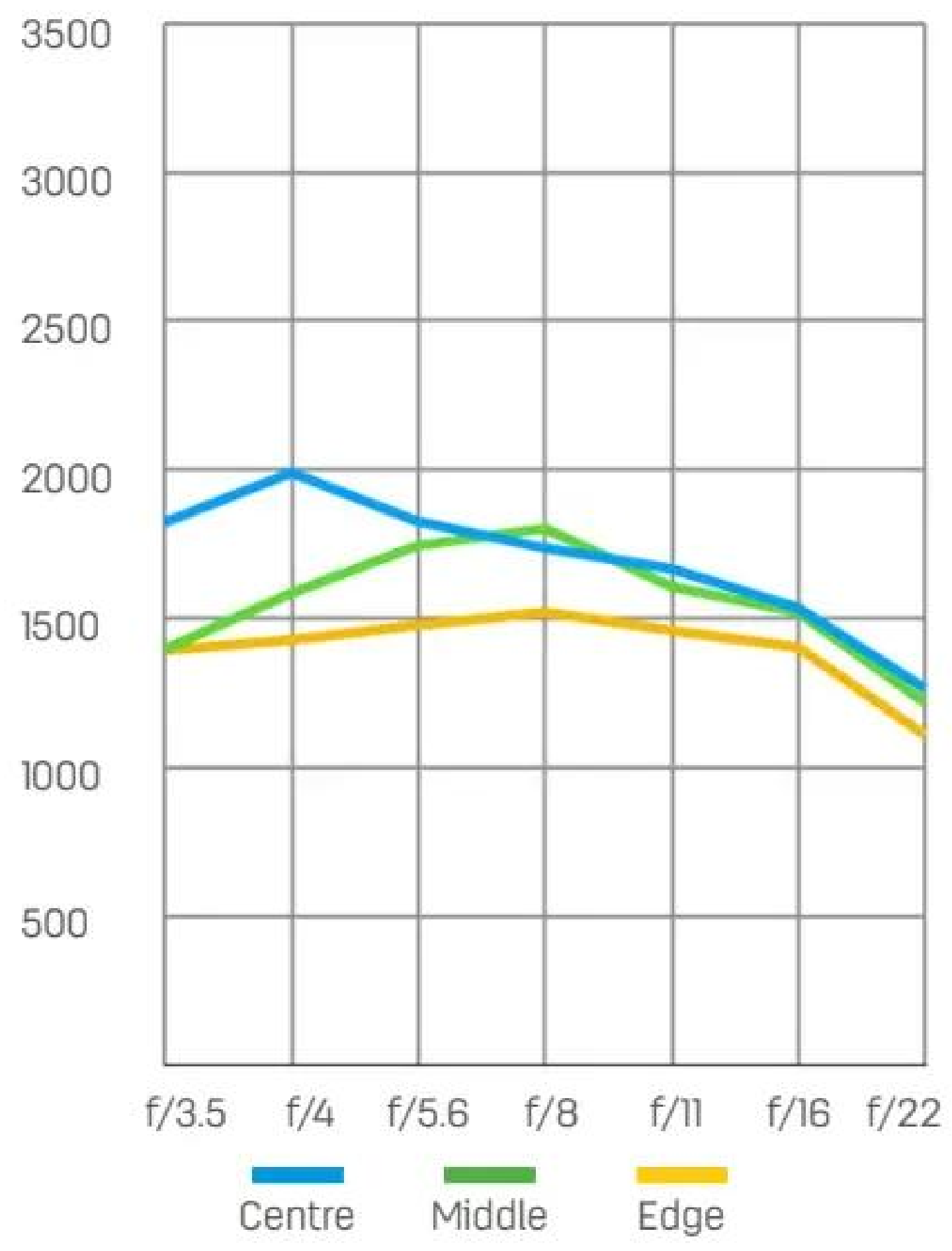
Many of us prefer to focus manually for macro shooting. Depth of field tends to be so tiny that you often need to be very selective. This Samyang lens isn't just a manual-focus optic, but generally lacks any electronics at all in its plethora of mount options. The only exception is the Nikon-fit version, which enables aperture adjustment from the camera body rather than via the lens's onboard aperture ring.

This means that on an SLR (apart from Nikon), the viewfinder image becomes dark when using the narrow apertures that are typically required in macro shooting. However, the lens works a treat in Live View mode, or with mirrorless cameras.

Performance

The focus ring is ideal for making precise adjustments. Image quality is very good as well.

SHARPNESS HIGHER IS BETTER



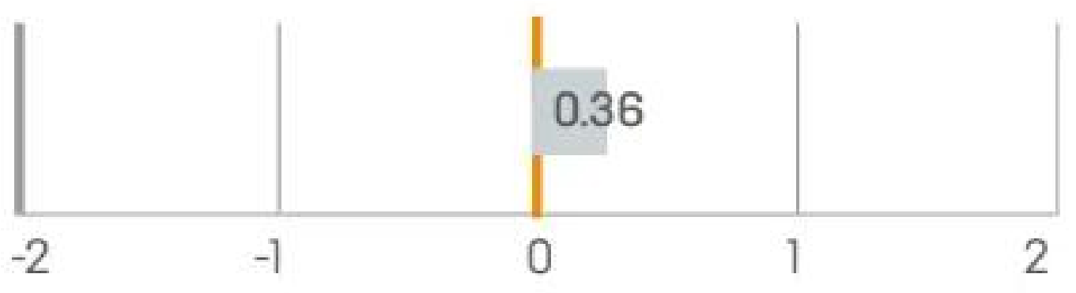
Levels of sharpness are pretty good overall, and are quite consistent across the frame.

FRINGING LOWER IS BETTER

Fringing	1.74

There's barely any fringing at wide apertures, but it creeps up a little at narrower settings.

DISTORTION NEARER 0 IS BETTER



There's slight pincushion distortion, but it generally goes unnoticed in shots.

VERDICT

FEATURES	★★★☆
BUILD & HANDLING	★★★★☆
PERFORMANCE	★★★★☆
VALUE	★★★★☆
OVERALL	★★★☆☆

Mount options: Sony E

Sigma 105mm f/2.8 DG DN Macro | A

£699/$799

Sigma's first 'Global Vision' macro

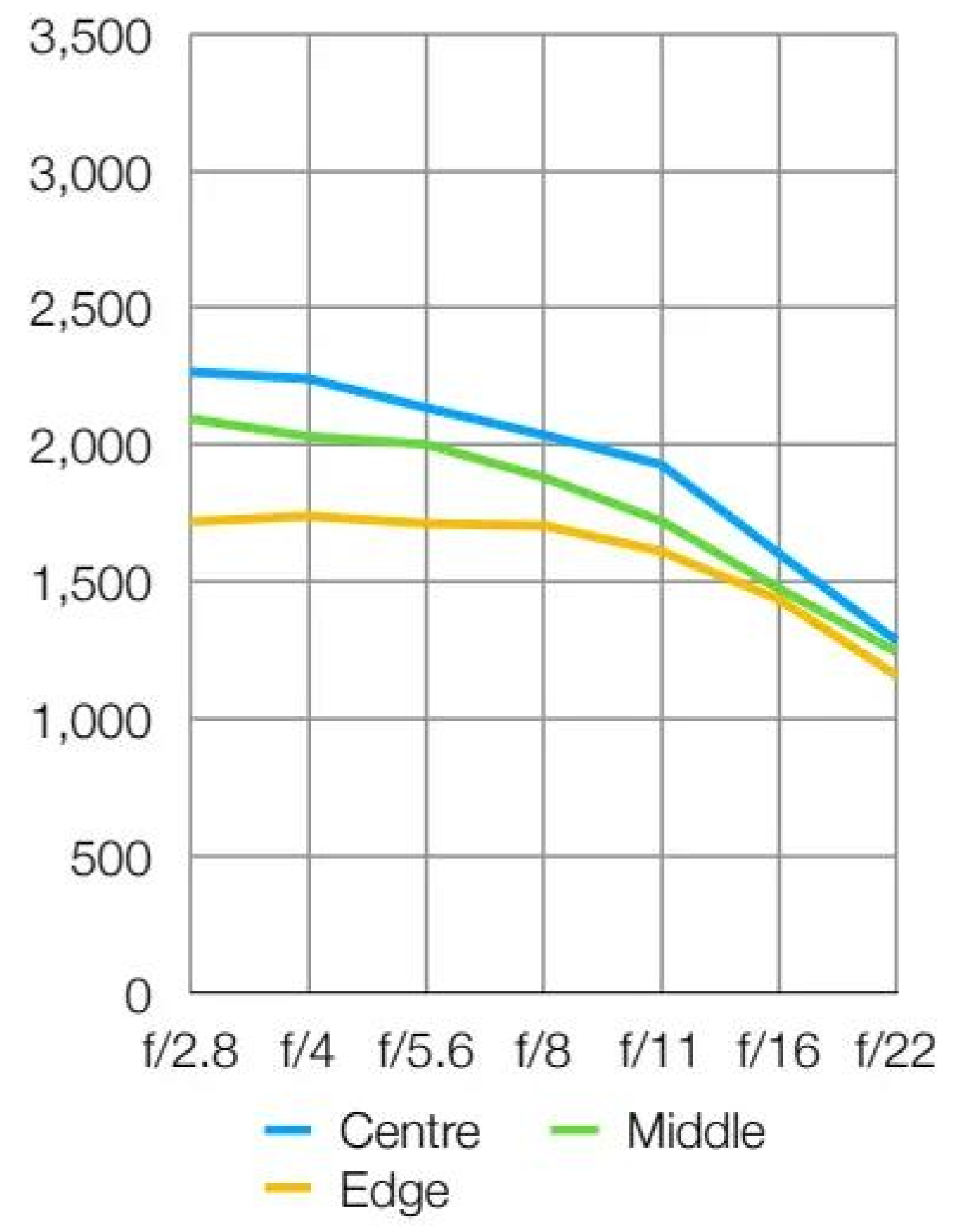
Unlike some of Sigma's DG HSM lenses that have been repurposed to fit L-Mount and Sony E mirrorless bodies, this DG DN lens is all-new. This Samyang lens isn't just a manual-focus optic, but generally lacks any electronics at all in its plethora of mount options. The only exception is the Nikon-fit version, which enables aperture adjustment from the camera body rather than via the lens's onboard aperture ring.

This means that on an SLR (apart from Nikon), the viewfinder image becomes dark when using the narrow apertures that are typically required in macro shooting. However, the lens works a treat in Live View mode, or with mirrorless cameras.

Performance

Autofocus is fast, accurate and near-silent, while manual focusing is precise. Image quality is fabulous and, for levels of sharpness, it eases ahead of the older Sigma 105mm lens.

SHARPNESS HIGHER IS BETTER



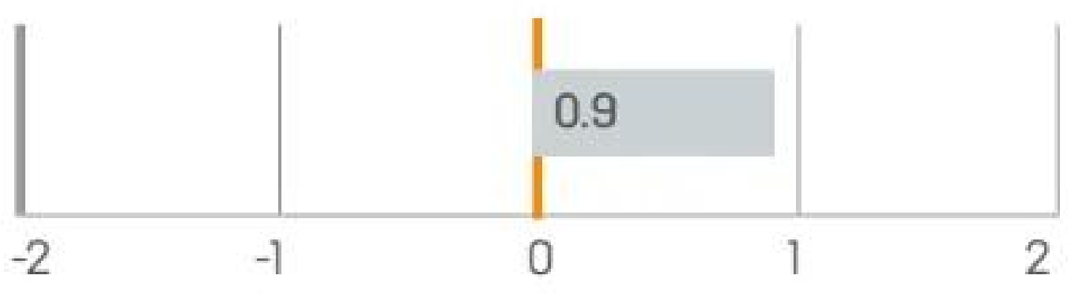
Levels of sharpness are pretty good overall, and are quite consistent across the frame.

FRINGING LOWER IS BETTER

Fringing 0.68

Colour fringing is extremely negligible throughout the entire aperture range.

DISTORTION NEARER 0 IS BETTER



There's a touch of pincushion distortion, but not enough to be generally noticeable.

VERDICT	
FEATURES	★★★★☆
BUILD & HANDLING	★★★★★
PERFORMANCE	★★★★★
VALUE	★★★★★
OVERALL	★★★★★

Digital Camera ★★★★★ GOLD AWARD

Digital Camera ★★★★★ BEST ON TEST

Digital Camera ★★★★★ BEST FOR NIKON

Digital Camera ★★★★★ BEST FOR CANON

Mount options: Canon EF Sony E

Tamron SP 90mm f/2.8 Di VC USD Macro

£649/$649

A big lens in every way

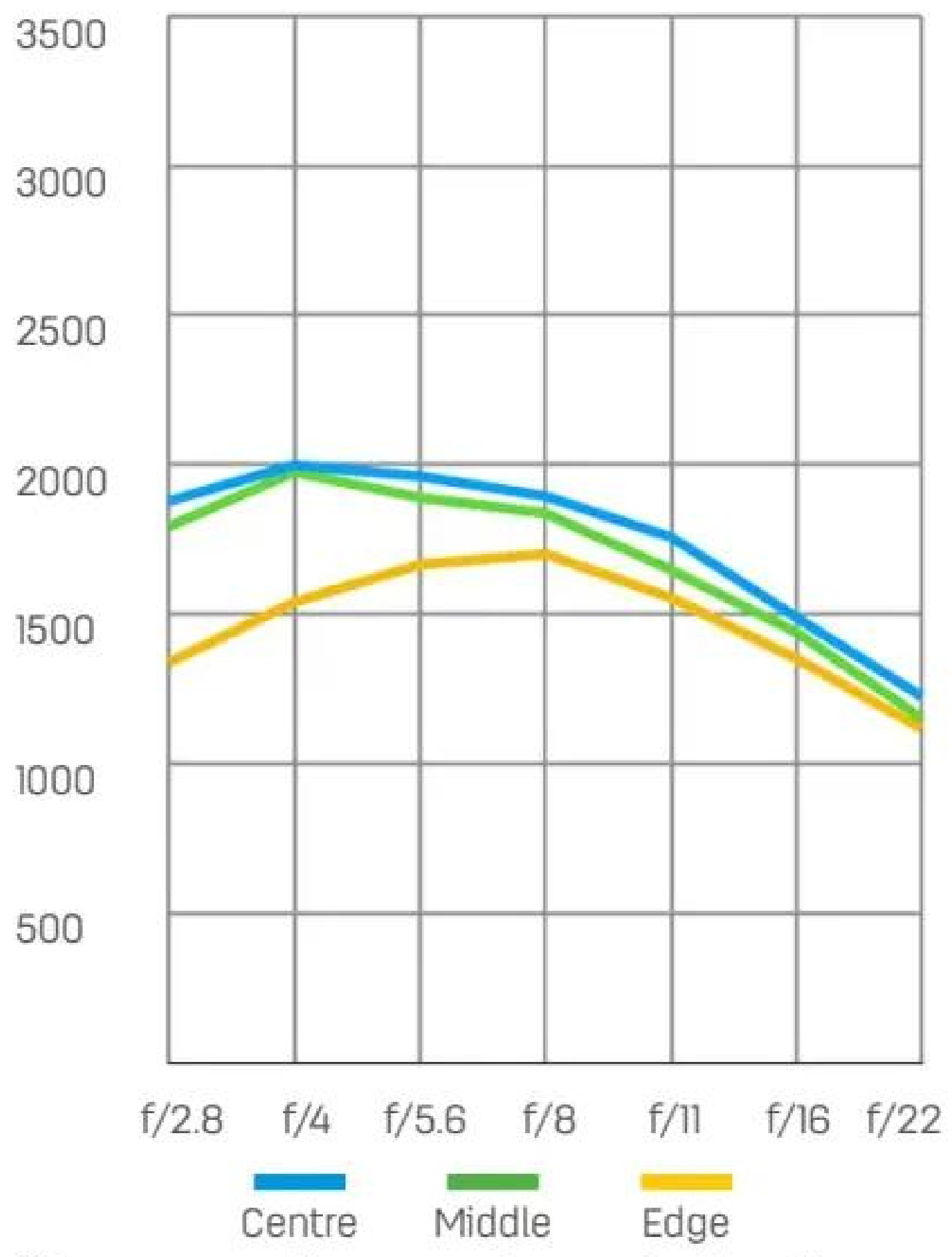
Tamron's highly popular line of 90mm macro lenses stretches all the way back to 1979. Updates in the latest edition include a revised optical layout that features two top-grade XLD (eXtra Low Dispersion) elements. Conventional and nano-structure coatings team up to keep ghosting and flare to a minimum.

Another notable upgrade is that Tamron has also added a 'hybrid' optical stabiliser. As with the Canon lens on test, this corrects for x-y shift as well as the more usual angular vibration. Again, performance drops from four to about two stops at fairly close range, and it's of little value in full macro shooting.

Performance

Lab scores for sharpness at medium ranges are good, but the Tamron proved absolutely excellent at really short focus settings.

SHARPNESS HIGHER IS BETTER



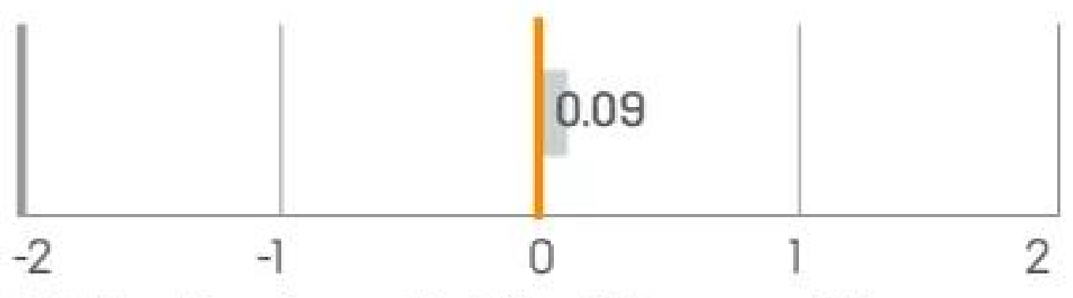
Close-range sharpness is even better than our medium-range lab tests would imply.

FRINGING LOWER IS BETTER

Fringing 1.36

Levels of colour fringing creep up a bit at narrower apertures, but are quite minimal.

DISTORTION NEARER 0 IS BETTER



Distortion is negligible. It's one of the very best lenses in the group in this respect.

VERDICT	
FEATURES	★★★★★
BUILD & HANDLING	★★★★★
PERFORMANCE	★★★★★
VALUE	★★★★½
OVERALL	★★★★★

WIDE-ANGLE ZOOMS

__Matthew Richards__ reveals the best wide boys for APS-C cameras

Nothing exaggerates perspective like a really wide-angle lens. Get in close and you'll be rewarded with sensational creative effects. All of the zoom lenses we've selected for this group test go seriously wide, and are designed specifically for crop-sensor cameras.

If you've not tried one before, you'll be amazed at how much more you can shoehorn into the image frame, compared with using a standard zoom lens. Ideal for the great outdoors, these lenses can capture vast, rolling landscapes. They're arguably even more useful indoors, when you're trying to shoot architectural interiors.

Not just for the bigger picture, these wide-angle optics tend to produce very little distortion at the long end of their zoom range. They can therefore be a preferable option to using your standard zoom at its shortest focal length. Let's get stuck in for a closer look.

THE CONTENDERS

1	**Canon** RF14-35mm F4L IS USM	£1,749/$1,699
2	**Laowa** 9mm f/2.8 Zero-D	£499/$499
3	**Canon** EF-S 10-18mm f/4.5-5.6 IS STM	£200/$280
4	**Fujifilm** XF 10-24mm f/4 R OIS	£760/$1,000
5	**Olympus** 7-14mm f/2.8 Pro M.Zuiko Digital ED	£1,000/$1,200
6	**Sigma** 14-24mm f/2.8 DG HSM | A	£1,169/$1,299
7	**Tamron** 10-24mm f/3.5-4.5 Di II VC HLD	£580/$500
8	**Samyang** MF 14mm f/2.8 Z	£359/$439

James Paterson

35
28
24
20
14
Canon
14-35
AF
MF

CSC www.canon.com

Canon RF14-35mm F4L IS USM

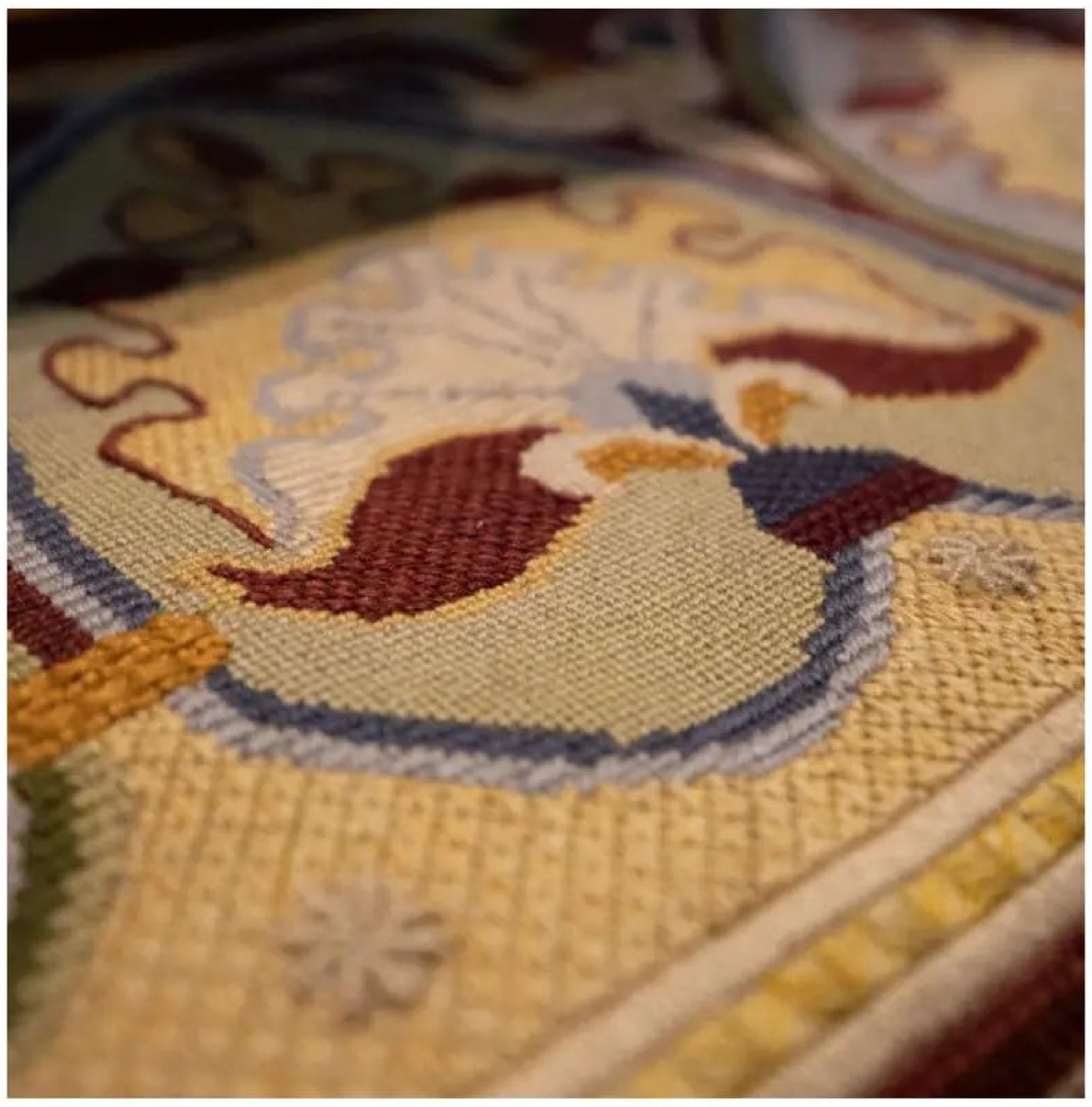
£1,749/ $1,699

Super-wide focal length and lots of features, is this Canon's best value RF lens yet?

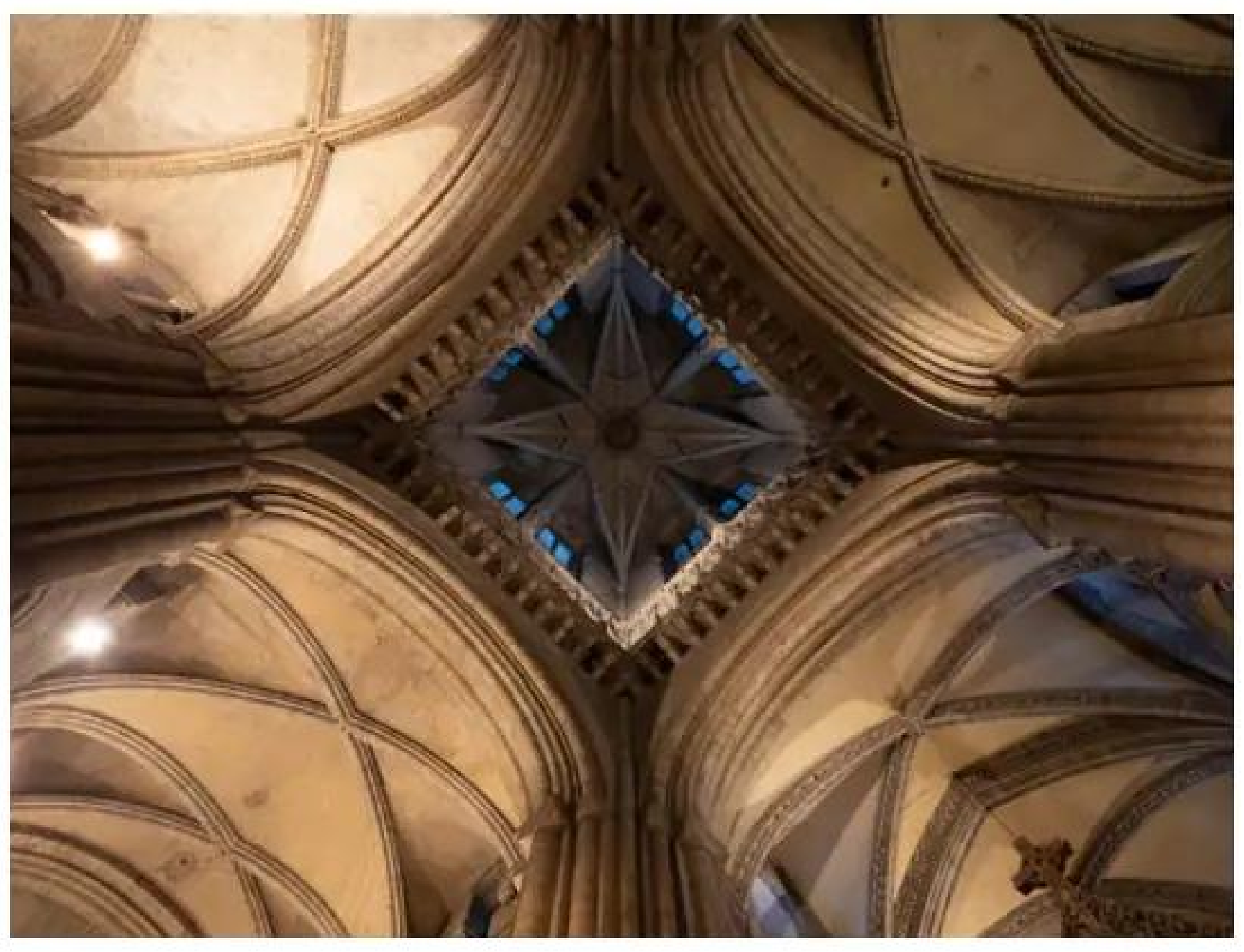
No, this isn't a budget RF15-35mm F2.8L IS USM. While the 'trinity' f/2.8 lenses get the attention, Canon's f/4 siblings are exceptional options. At these focal lengths, a single millimetre can make a big difference, so many photographers will choose this for the extra field of view. The lens extends when zoomed, but it's minimal and the zoom control is smooth. The barrel is compact and lightweight, making this lens ideal for travel. It's also perfectly balanced on the EOS R and R5. Plastic is used, but the body is weather-sealed.

Performance

The optics are beautifully sharp at almost all apertures. There is hardly a difference between f/4 and f/8 and resolution is superb. This performance is well maintained at the edges and though there is barrel distortion, it's easily corrected. AF is fast and near-silent, while the IS system is spectacular. Paired with an IBIS-equipped EOS, you can handhold at exposures over one second. The close-focusing distance is impressive – magnification isn't in macro territory, but at 20cm, you can fill the composition with foreground details and push the background out of focus.



A 20cm short working distance is good for wide-angle perspective and shallow depth-of-field – and effective in capturing foreground detail in landscape scenes.



Despite an f/4 maximum aperture, the ultra-wide FOV and effective IS make this ideal for handheld interiors. Canon claims up to 5.5 stops of shake reduction.

SPECIFICATIONS

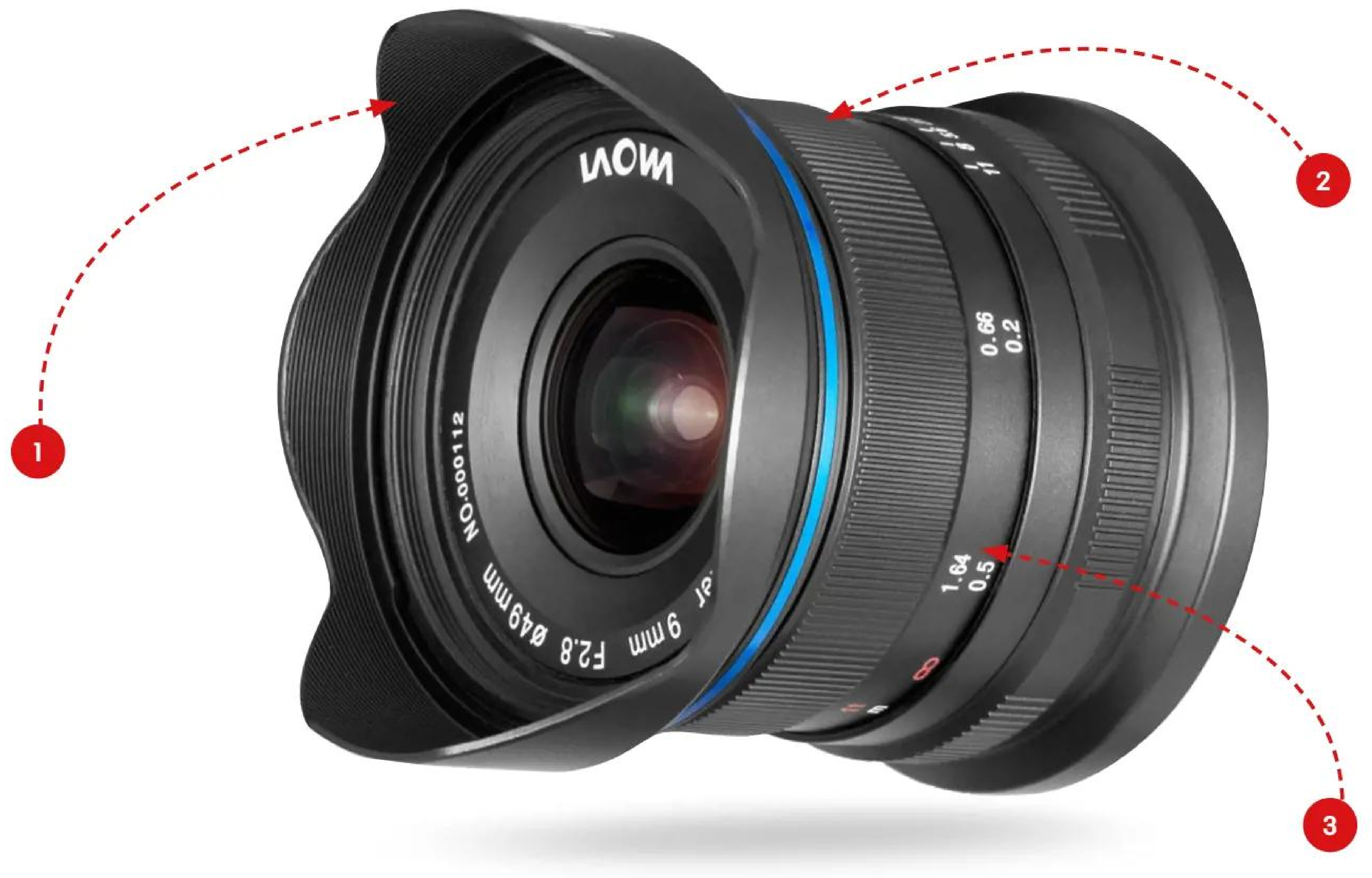
Elements/construction 16 elements in 12 groups
Angle of view 114° to 63°
Max aperture f/4
Min aperture f/22
Min focus distance 0.20m
Mount Canon RF
Filter size 77mm
Length 99.8mm
Diameter 84.1mm
Weight 540g

WE SAY...

If you rarely need f/2.8 but will appreciate the 14mm perspective, this is a much better option than the more expensive RF15-35mm optic. The balance of portability and performance make this a must-have for landscape, interior, travel and event photographers. The control ring rounds off an exceptional specification for the money.

VERDICT

FEATURES	★★★★★
BUILD & HANDLING	★★★★★
PERFORMANCE	★★★★★
VALUE	★★★★★
OVERALL	★★★★★



CSC www.laowalens.co.uk

Laowa 9mm f/2.8 Zero-D

£499/$499

Digital Camera
★★★★★
GOLD AWARD

The Laowa 9mm's size, handling and optical performance are simply awesome

If you've bought an APS-C mirrorless camera, the chances are it's because you want a compact, portable camera kit – so the last thing you need is a big, fat zoom lens to cover off all the focal lengths you need. One of the things that makes the Laowa 9mm f/2.8 Zero-D especially appealing for Sony E, Canon EOS M or Fujifilm X-mount camera owners is its size. You can get ultra-wide zooms for these cameras, but they can't match the Laowa's size, or indeed its f/2.8 maximum aperture. You can even fit 49mm filters to the front.

This is a manual-focus lens, which proves less of a problem than you might think, but with no mechanical or electrical connections to the camera, it means you'll need to use manual exposure too.

Build and handling

The Laowa feels beautifully made, with a smooth, long-travel focus ring and a distance scale with enough markings for fairly precise zone focusing, plus depth of field markings for each aperture, for gauging hyperfocal distances. In practice, at these focal lengths practically everything falls within the lens's depth of field unless you're shooting objects close to the camera at wide apertures.

Manual exposure is similarly painless, especially if the camera body has a shutter speed dial or a control dial you can use for this function. The lens aperture is set manually using a ring on the lens.

Performance

The 'Zero-D' in this lens's name refers to its zero-distortion design, and it's justified. Regular ultra-wide zoom lenses delivery good doses of barrel distortion and pretty soft edges, but the Laowa is different. Straight lines (and horizons) stay dead straight right up to the edges of the frame, and detail is super-sharp.

Rod Lawton

① This slim petal-shaped lens hood is included, but you can also detach this and fit 49mm filters – it's unusual to be able to do this with such a wide lens.

② The aperture is set manually on the lens, not via the camera body. It means manual, stopped-down exposure, which is easier than it sounds.

③ The manual focus ring has a smooth, long travel, with distance and depth of field markings for effective zone focusing and hyperfocal focusing.

SPECIFICATIONS

Full-frame compatible No
Mounts Canon EOS M, Fujifilm X, Sony E
Effective focal length 13.5mm (APS-C)
Image stabiliser No
Minimum focus distance 12cm
Angle of view 113 degrees
Focusing Manual
Maximum aperture f/2.8
Minimum aperture f/22
Aperture blades 7
Supplied accessories Front and rear caps, lens hood
Dimensions (dia x length) 60 x 53mm
Weight 215g

As with any lens this wide, tilting the camera upwards to capture tall buildings can result in very strong converging verticals.

There is some lens flare on the far right side of this image, but that's because the naked sun is in the frame – otherwise, the Laowa 9mm f/2.8 is not particularly prone to flare.

WE SAY...

Laowa might not be one of the best-known brands out there, but the 9mm f/2.8 Zero-D is a serious, premium-quality lens, both optically and in terms of build quality. Don't be put off by the manual controls: you'll adapt surprisingly quickly, and the payback is edge-to-edge sharpness and a distortion-free rendering you'll rarely see from a lens this wide.

VERDICT

FEATURES	★★★★☆
BUILD & HANDLING	★★★★★
PERFORMANCE	★★★★★
VALUE	★★★★☆
OVERALL	★★★★★

Digital Camera ★★★★★ GREAT VALUE

Mount option: Canon EF-S

Canon EF-S 10-18mm f/4.5-5.6 IS STM

£200/$280

Small, simple and very affordable

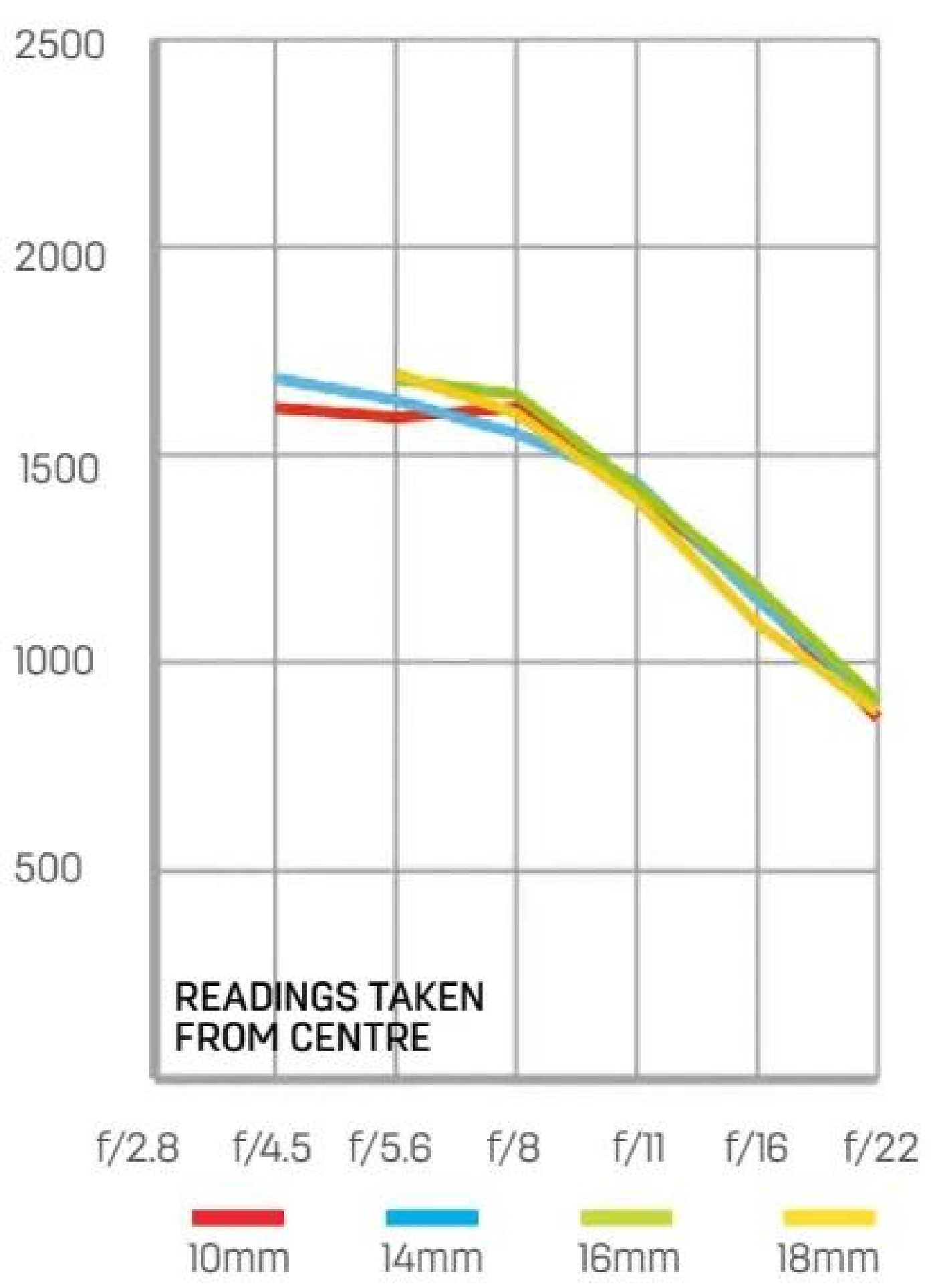
Canon has aimed for a compact, lightweight build in its latest wide zoom, making this lens a good match for cameras like the 1300D and the 200D. Part of the weight loss is achieved by using a plastic rather than metal mounting plate, but the lens feels reasonably robust. Autofocus is driven by a stepping motor, delivering near-silent operation and smooth transitions when using continuous AF during movie capture.

Handheld shooting in dark conditions and indoors benefits from an optical stabiliser, not featured in Canon's older 10-22mm wide zoom. It's the least expensive lens in the group but, as usual with Canon's budget and mid-range lenses, you need to buy the hood separately. The genuine EW-73C costs around £25/$25.

Performance

Sharpness is good rather than great, but remains quite consistent through the zoom and aperture ranges. The image stabiliser gave a three-stop effectiveness in our tests and the electronic 'fly by wire' focus ring offers good precision. Overall, this budget lens is well suited to travel photography.

SHARPNESS HIGHER IS BETTER



Levels of sharpness are as good as in Canon's pricier 10-22mm lens.

FRINGING (AT F/8) LOWER IS BETTER

Wide 2.58 Mid 1.71 Tele 2.51

Decent fringing performance is consistent throughout the zoom range.

DISTORTION NEARER 0 IS BETTER

Wide -2.7 Mid -1.86 Tele 0.45

Barrel distortion is restrained at 10mm; there's just a touch of pincushion at 18mm.

VERDICT	
FEATURES	★★★★☆
BUILD & HANDLING	★★★½☆
PERFORMANCE	★★★★☆
VALUE	★★★★★
OVERALL	★★★★☆

Digital Camera ★★★★★ BEST ON TEST
Digital Camera ★★★★★ GOLD AWARD
Digital Camera ★★★★★ EDITORS CHOICE

Mount option: Fujifilm X

Fujifilm XF 10-24mm f/4 R OIS

£760/$1,000

Smart build, great performance

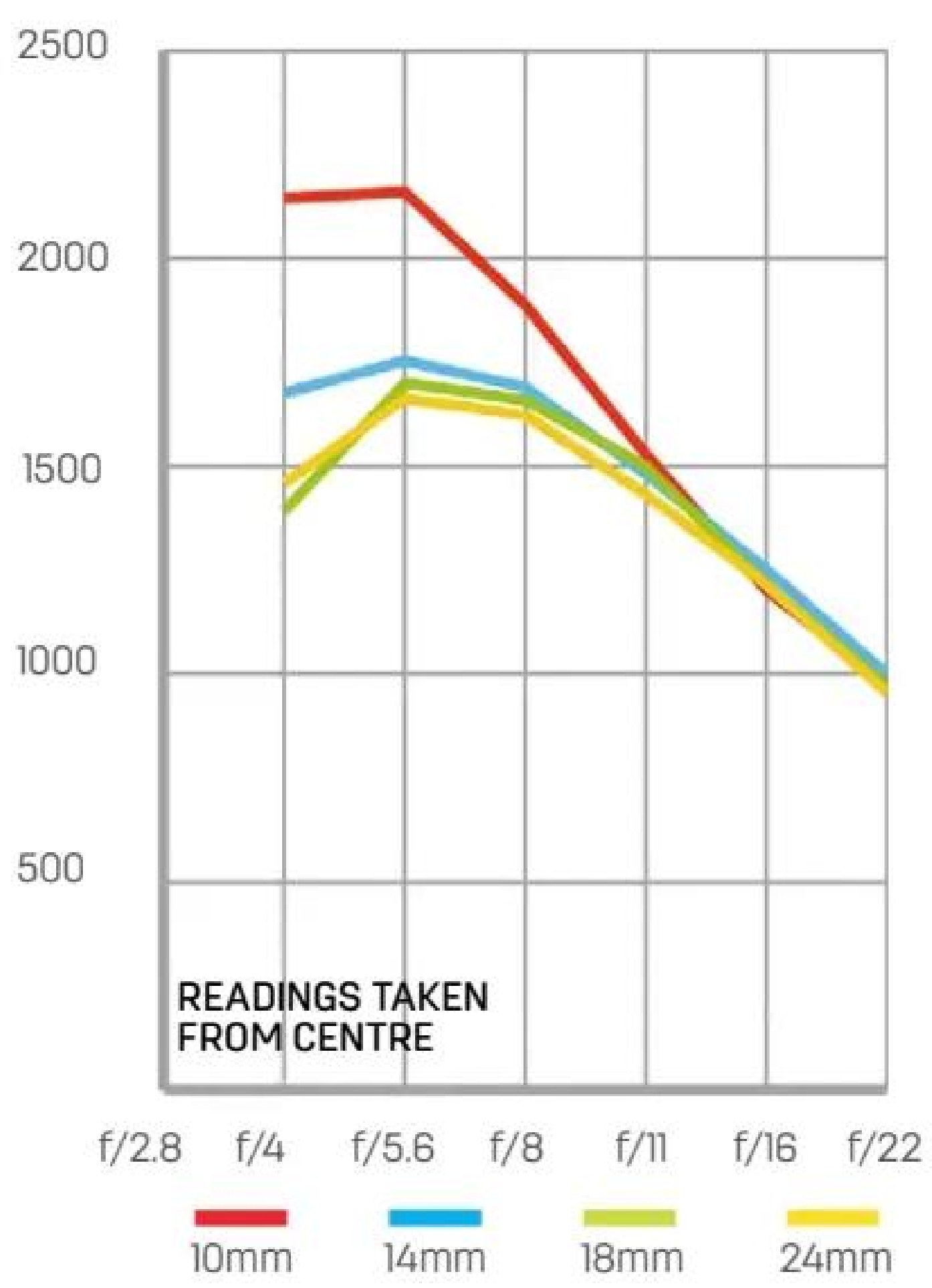
Well engineered with a metal barrel and mounting plate, this constant-aperture zoom lens looks and feels like a fully professional-grade optic. As one of Fujifilm's 'R' lenses, it's fitted with an aperture ring near the rear. A switch on the barrel enables you to easily swap between automatic and manual adjustment.

High-performance glass includes four aspherical elements and four ED (Extra-low Dispersion) elements. Zoom and focus mechanisms are both fully internal, so the front element neither extends nor rotates. The autofocus system is based on a stepping motor, which also enables precise adjustments via the focus ring. An optical image stabiliser is included and the lens comes with a hood.

Performance

Corrections are applied in-camera, even when shooting in raw quality mode, which flatter the lens in terms of distortion, chromatic aberrations and vignetting. Even so, contrast is excellent and sharpness at the short end of the zoom range is stunning, even when shooting wide-open.

SHARPNESS HIGHER IS BETTER



Excellent sharpness drops off a little at longer settings using the widest aperture.

FRINGING (AT F/8) LOWER IS BETTER

Wide 0.77 Mid 0.36 Tele 0.68

There's essentially no colour fringing to be seen, even in the extreme corners.

DISTORTION NEARER 0 IS BETTER

Wide -0.23 Mid 0.14 Tele 0.33

With automatic corrections in-camera, it becomes a distortion-free lens.

VERDICT	
FEATURES	★★★★½
BUILD & HANDLING	★★★★★
PERFORMANCE	★★★★★
VALUE	★★★★½
OVERALL	★★★★★

OLYMPUS M.ZUIKO DIGITAL
OLYMPUS
L-Fn
Digital Camera
★★★★★
BEST FOR MICRO 4/3

Mount option: Micro Four Thirds

Olympus 7-14mm f/2.8 Pro M.Zuiko Digital ED

£1,000/$1,200

It rises to the challenge

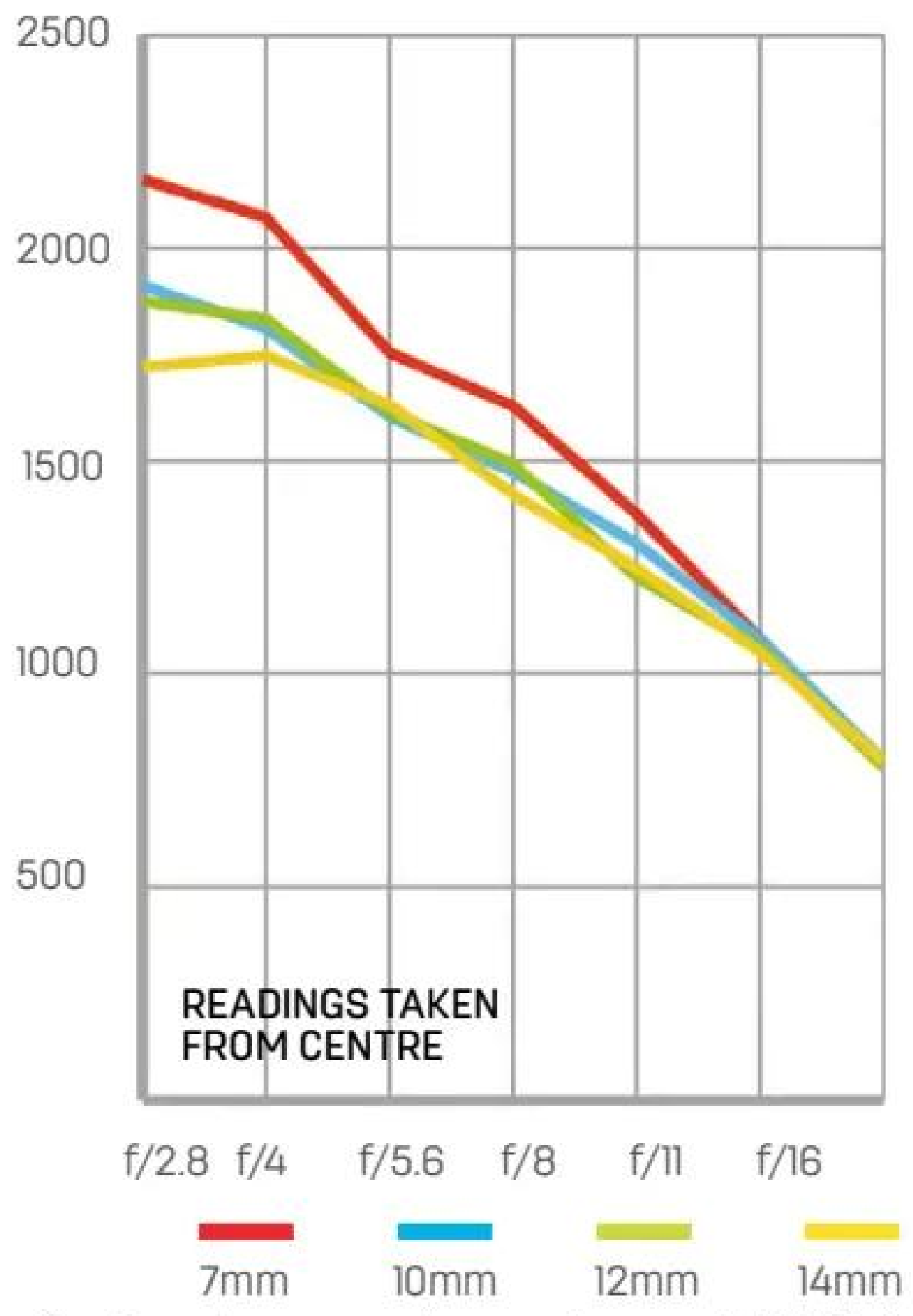
Olympus faced a tough challenge designing an ultra-wide zoom to overcome the 2.0x crop factor of the Micro Four Thirds format. A technical triumph from the 'Pro' stable, this weather-sealed, metal-jacketed lens is beautifully built.

Top-notch optics include an ED element, three Super ED elements and two HR (High Refractive index) elements. Handling benefits from super-smooth mechanical zoom and electronically coupled focus rings, the latter enabling quick and easy switching between auto and manual focusing via a push-pull mechanism. A handy 'L-Fn' button can be assigned to wide-ranging functions, via in-camera menus. There's no optical stabiliser: with Olympus bodies featuring sensor-shift stabilisation, it doesn't need one.

Performance

As with the Fujifilm lens on test, in-camera corrections enhance the optical qualities of the Olympus, even in raw mode. However, native sharpness is exemplary, even at the generous widest aperture of f/2.8, which remains available throughout the zoom range.

SHARPNESS HIGHER IS BETTER



Centre-sharpness is great even at f/2.8, but corners benefit from stopping down a little.

FRINGING (AT F/8) LOWER IS BETTER

Wide 0.82 **Mid** 0.43 **Tele** 0.52

Chromatic aberrations are basically a non-issue, even in the extreme corners.

DISTORTION NEARER 0 IS BETTER

Wide -1.84 **Mid** -1.1 **Tele** -0.41

Distortions aren't quite as fully corrected as in the Fujifilm lens, but go unnoticed.

VERDICT

FEATURES	★★★★⯪
BUILD & HANDLING	★★★★⯪
PERFORMANCE	★★★★⯪
VALUE	★★★★☆
OVERALL	★★★★⯪

14-24mm 1:2.8 DG
Digital Camera
★★★★★
GOLD AWARD

Mount options: Canon EF | Nikon DX | Sigma SA

Sigma 14-24mm f/2.8 DG HSM | A

£1,169/$1,299

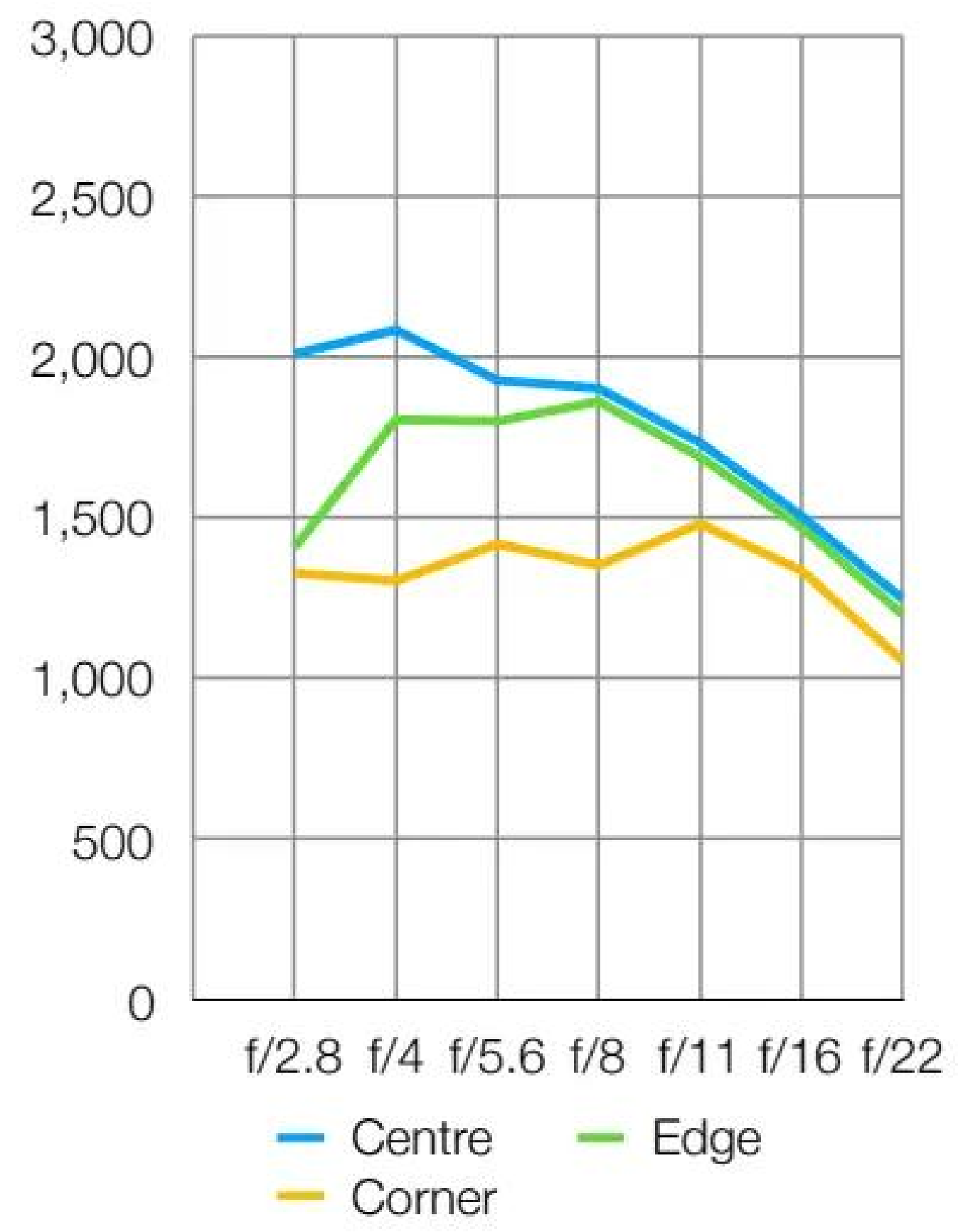
The best full-frame astro zoom

Available in Canon and Nikon mounts, this Sigma lens is up against own-brand legends like the Canon EF 16-35mm f/2.8L USM III and the Nikkor AF-S 14-24mm f/2.8G ED. It beats both of them for image quality and price. Build quality and handling are excellent in both Sigma lenses on test but the zoom gains a full set of weather-seals, whereas the prime lens only has a sealed mounting plate. Both feature a fluorine coating on the front element and are compatible with Sigma's optional USB Dock for customisation and firmware updates.

Performance

Even at the shortest focal length with the widest aperture, sharpness is excellent across the entire frame. Vignetting is remarkably minimal and barrel distortion in real-world shooting is negligible. Lateral and spherical aberrations are very well controlled.

SHARPNESS HIGHER IS BETTER



This zoom lens does very well to retain excellent corner sharpness at wide apertures.

FRINGING (AT F/8) LOWER IS BETTER

Wide 0.5

There's practically no colour fringing, even at the far corners of the image.

DISTORTION NEARER 0 IS BETTER

Wide -4.99

In real-world shooting, it'll be tough to spot any distortion at all.

VERDICT

FEATURES	★★★★⯪
BUILD & HANDLING	★★★★★
PERFORMANCE	★★★★★
VALUE	★★★★⯪
OVERALL	★★★★★

Digital Camera
★★★★★
BEST FOR CANON
Digital Camera
★★★★★
BEST FOR NIKON

Mount options: Canon EF-S Nikon DX

Tamron 10-24mm f/3.5-4.5 Di II VC HLD

£580/$500

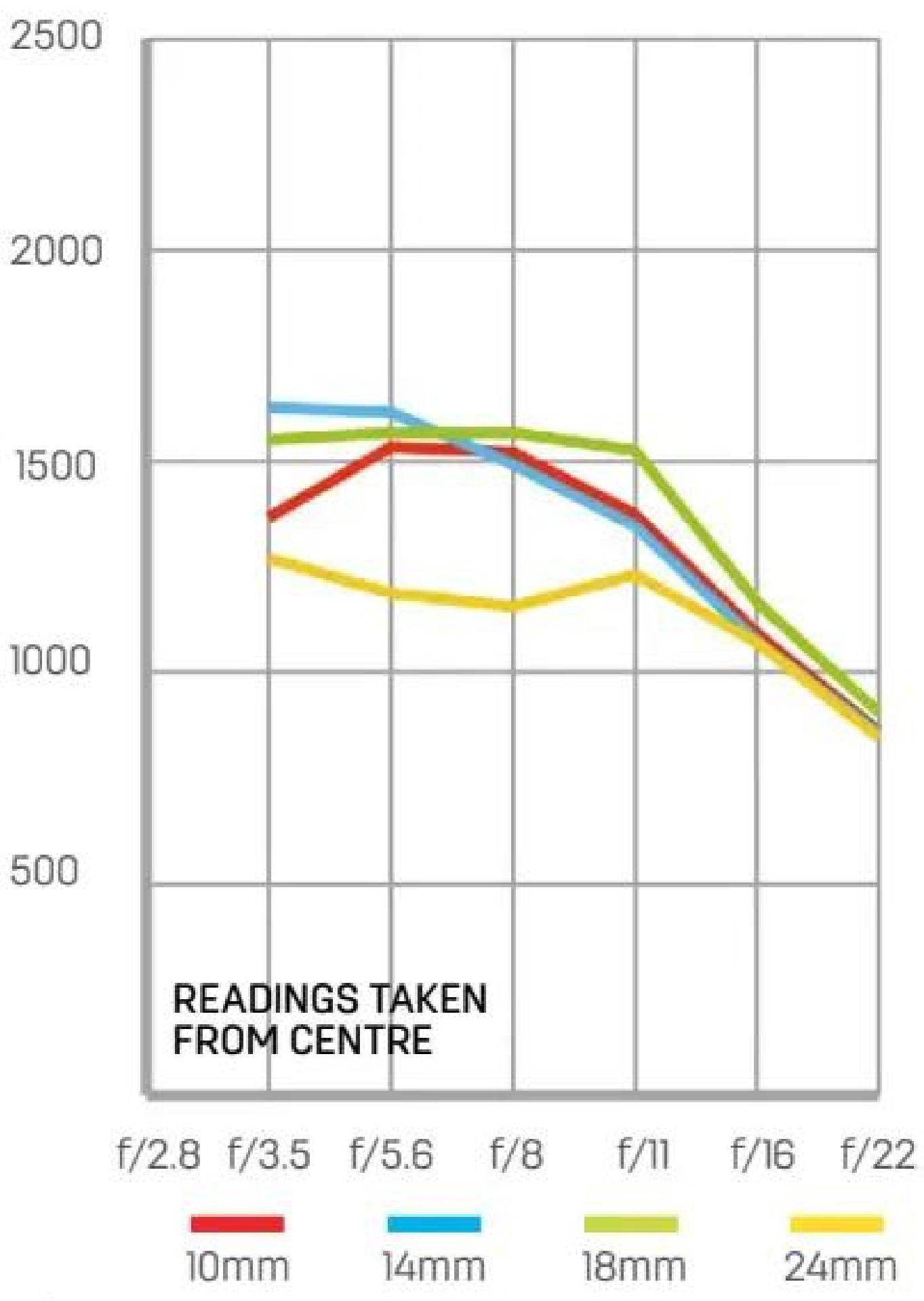
New and much improved

Available in Canon and Nikon mount options, this new edition of Tamron's popular 10-24mm is a radical revamp. New features include HLD (High/Low toque-modulated Drive) autofocus, which is quicker and quieter than in the original lens. It also improves handling, as the focus ring no longer rotates during autofocus, and adds full-time manual override. There's also Tamron's Vibration Compensation stabilisation system. Build quality is uprated with a moisture-resistant design that offers a weather-sealed mounting plate and fluorine-coated front element. Both mount options have an electromagnetically controlled aperture. This is bad news for owners of older Nikon DSLRs, as it makes the lens incompatible with many bodies up to and including the D200, D3000 and D5000. The same is true of Nikon's own 'E-type' lenses.

Performance

Tamron's optical stabiliser has class-winning four-stop efficiency. Autofocus isn't quite as quick or quiet as most ring-type ultrasonic systems, but it's not far behind.

SHARPNESS HIGHER IS BETTER



Sharpness is very good but lab scores are mediocre for shots at very close range.

FRINGING (AT F/8) LOWER IS BETTER

Wide 2.05 **Mid** 3.23 **Tele** 1.22

There's a bit of fringing at mid-zoom settings but very little at either end.

DISTORTION NEARER 0 IS BETTER

Wide -3.98 **Mid** 0.7 **Tele** 1.21

Barrel and pincushion distortions at either end of the zoom range are well controlled.

VERDICT

FEATURES	★★★★½
BUILD & HANDLING	★★★★½
PERFORMANCE	★★★★
VALUE	★★★★
OVERALL	★★★★½

Mount options: Canon EF-S Nikon DX

Samyang MF 14mm f/2.8 Z

£359/$439

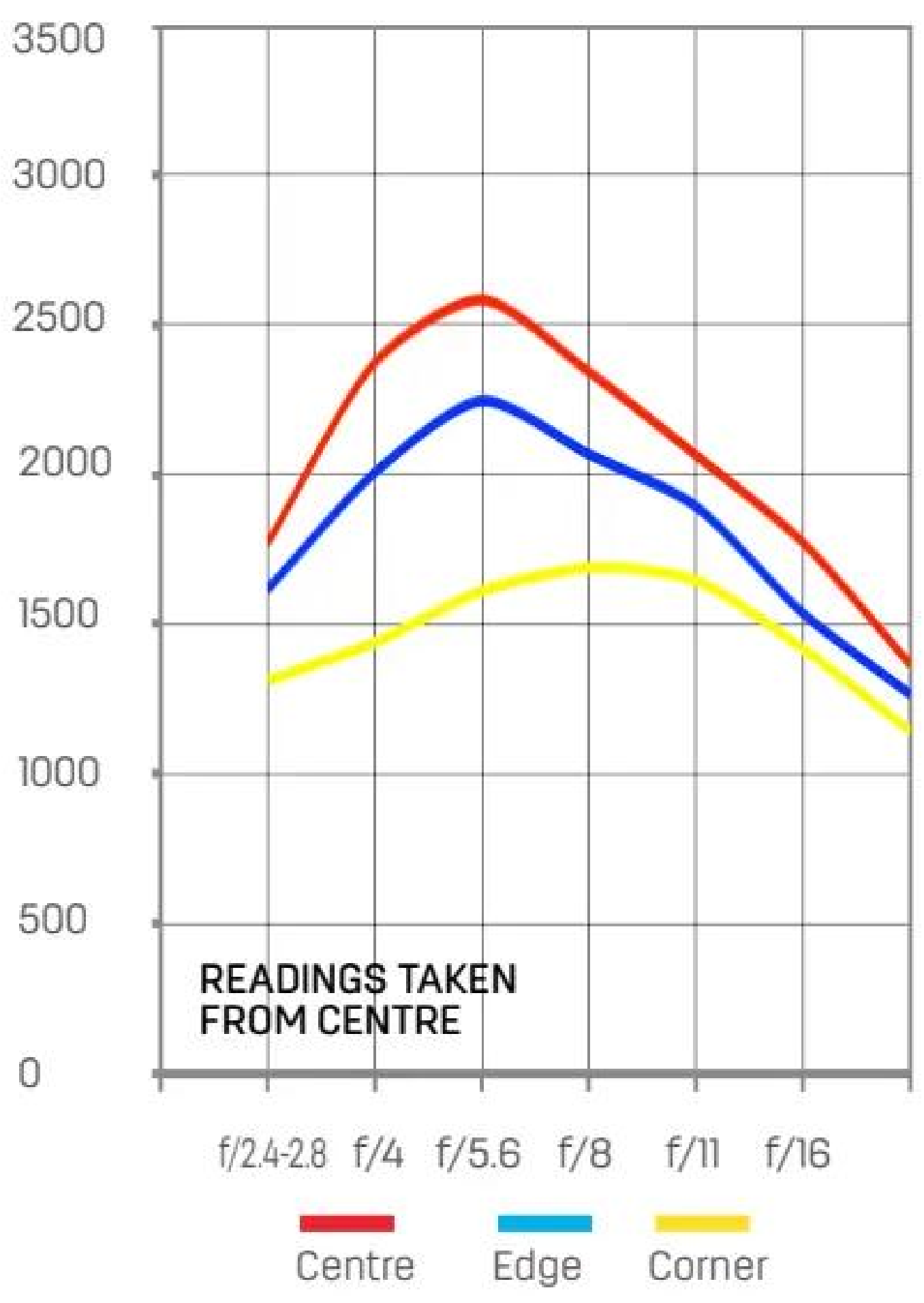
A fully manual Z-mount lens

This Samyang is entirely manual. As such, you need to set both the aperture and focus distance using the lens's on-board control rings, and there's no electronic communication with the camera body whatsoever. No lens-related EXIF information can be captured and stored within image files. On the plus side, the 14mm focal length and f/2.8 aperture make the lens ideal for astrophotography. Indeed, manual focusing generally works best for shooting the stars. Handling is very good with a silky-smooth action to the long-throw focus ring. The construction feels solid and includes weather-seals. High-quality glass includes aspherical, hybrid-aspherical, ED and HR elements.

Performance

Sharpness is very good across the entire image frame, even when shooting wide-open at f/2.8, along with minimal coma and astigmatism, so pinpoint light sources of stars are faithfully reproduced. Barrel distortion can look quite pronounced when shooting architectural subjects, but it's less of a problem in astrophotography.

SHARPNESS HIGHER IS BETTER



Sharpness is great but lab scores are mediocre for shots at close range.

FRINGING (AT F/8) LOWER IS BETTER

Wide 1.09 **Mid** 1.24 **Tele** 1.18

There's very little colour fringing, even towards the extreme corners of the image frame.

DISTORTION NEARER 0 IS BETTER

Wide -2.65

Barrel distortion is quite heavy and irregular, making it tricky to correct when editing images.

VERDICT

FEATURES	★★★½
BUILD & HANDLING	★★★★½
PERFORMANCE	★★★★
VALUE	★★★★½
OVERALL	★★★★½

CAMERA SHOPPER

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From the makers of Digital Camera, this issue of Camera Shopper is packed with reviews of all the latest and most important SLR and compact system (mirrorless) cameras. We've also included reviews of the best lenses and camera accessories.

60 IN-DEPTH REVIEWS
Cameras, lenses & accessories tested

Beginner cameras

Our in-depth reviews and group tests will help you find your ideal SLR or mirrorless system camera

Nikon Z 50
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